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## An International Comparison of Real Output and Labour Productivity in Manufacturing in Ecuador and the United States

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**An International Comparison of Real Output,  
and Labour Productivity in Manufacturing  
in Ecuador and the United States**

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Gjalt de Jong

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**An International Comparison of Real Output  
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by

Gjalt de Jong

University of Groningen

## **Table of Contents**

<b>I</b>	<b>Introduction</b>	<b>1</b>
<b>II</b>	<b>Ecuador</b>	<b>2</b>
<b>III</b>	<b>Methodology</b>	<b>6</b>
<b>IV</b>	<b>Data</b>	<b>9</b>
<b>V</b>	<b>A Comparison of output and labour productivity in Ecuador and the United States for 1980</b>	<b>13</b>
	Results for sample industries	14
	Results for manufacturing branches	16
	Updating of the results	19
<b>VI</b>	<b>Summary and Conclusions</b>	<b>20</b>
	<b>Bibliography</b>	<b>22</b>
	<b>Annex Tables</b>	
	Annex I Matching Tables	25
	Annex II Sample Industry Results	43
	Annex III Productivity Results for Oil Refineries	48

## List of Tables

Table 2.1	Growth rates of GDP per capita for Ecuador and six other Latin American countries	2
Table 2.2	GDP by kind of economic activity	3
Table 2.3	Structure of manufacturing in 1987	4
Table 2.4	Growth rates of manufacturing output for seven Latin American countries	4
Table 2.5	Share of manufacturing in total GDP for seven Latin American countries	5
Table 2.6	Exports of manufacturing products	6
Table 4.1	Ecuador: total production and total production of articles for sale in 1980	10
Table 4.2	Ecuador: US value added concept	11
Table 4.3	Ecuador: components of intermediate consumption	11
Table 4.4	Ecuador: labour input in manufacturing	12
Table 5.1	Ecuador: ranking of industries according to total production	13
Table 5.2	Basic census information for Ecuador and the USA	14
Table 5.3	Coverage ratios	15
Table 5.4	Results for sample industry dairy products	16
Table 5.5	Purchasing power parities by major manufacturing branch	17
Table 5.6	Gross value added by major manufacturing branch	17
Table 5.7	Gross value added per person engaged by major manufacturing branch	18

# I

## Introduction<sup>1</sup>

The aim of this study is to estimate and to compare labour productivity in manufacturing of Ecuador with that of the United States. The manufacturing sector in Ecuador is small in comparison with the manufacturing sector of the United States. In 1980 the total number of persons employed in the Ecuadorian manufacturing was 187,249 whereas 20,644 million persons were employed in the manufacturing sector of the United States. However, its role in the economy is important because it has important linkages with the rest of the economy. Productivity levels are useful indicators of the level of economic and technological development of an economy. Labour productivity comparisons, for instance between Ecuador and the United States, are usually made in a very direct way. The GDP of Ecuador, which is denominated in sucres, is converted into US dollars using the exchange rate. After this the resulting relative output is divided by labour input. Obviously, a critical factor in this procedure is the exchange rate. In general, there are three problems when using the exchange rate as a conversion factor. First, it is subject to major fluctuations. Secondly, capital movements strongly effect its level. Thirdly, the exchange rate primarily reflects the purchasing power of currencies in terms of goods and services which enter international trade. Thus another price relative, i.e. a purchasing power parity, is needed to circumvent the problems of the exchange rate. This study estimates purchasing power parities for the manufacturing sector, based on a comparison of a sample of manufacturing products. For Ecuador and the United States this has not been done before. These PPPs are used as the conversion factors for industrial output and value added.

Most studies estimate purchasing power parities for final demand components. The largest and most sustained effort using this "expenditure approach" is the International Comparisons Project of the United Nations (see Kravis, Heston and Summers 1982). This approach is useful for the analysis of macro economic performance of countries but can not be used for sectoral analysis, which is the aim of this study, since it does not show real product by industry.

An alternative measure of purchasing power parities is that which is derived by the "industry of origin" approach. This compares unit values of a basket of goods between countries and applies the resulting price relatives as conversion measures for the value of industrial output and value added. A special feature of this approach is its sectoral

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<sup>1</sup> The largest share of this research project was carried out during a three months visit at the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) in Santiago Chile. I would like to express my gratitude to ECLAC for the opportunity given to me through this visit. My discussions with André Hofman concerning this project have been most valuable. Oscar Altimir, director of the Economic Development Division (ECLAC), provided important insights in the relationship between the national accounts and the census of Ecuador. The discussions with Ruud Buitelaar helped to provide insights into various aspects of the manufacturing sector in Ecuador. I recieved useful comments from Bart van Ark, Angus Maddison and Dirk Pilat on an earlier draft of this paper. Tineke Tadema helped with the lay-out of the final version. This research was supported by the University of Groningen and the Dr. Mullers Vaderlandsch Fonds. This paper is based on my Masters thesis (University of Groningen, July 1993)

perspective. Here I use the "industry of origin" approach developed in the ICOP project at the University of Groningen (see Maddison and Van Ark, 1988).

## II Ecuador

Following Maddison (1987) and Hofman (1992) the economic development of Latin America in the 20th century can be divided into distinctive phases. Table 2.1 provides the growth figures for the detailed phases.

The first phase of the twentieth century, 1900-13, shows a rapid increase in GDP per capita for Ecuador of 2.5% annually, which is well above the average of the 1.9% growth rate for Latin America as a whole. Of all other countries only Argentina could keep up with this rate of growth. In the second phase, 1913-29, Ecuador slowed down to a growth rate of 1.6% annually, a slowdown which also occurred in Argentina, Mexico and Chile. However, the growth rate of Ecuador was still the same as the average for Latin America. The "Great Depression" of 1929 caused a break with this excellent performance. Ecuador fell down to zero growth in the 1929-38 phase. Brazil and Colombia stayed at their high levels of growth while the rest of Latin America stagnated or achieved negative rates of growth.

Table 2.1  
Growth Rates of GDP per Capita for Ecuador and six other Latin  
American Countries, 1900-1989

	1900 13	1913 29	1929 38	1938 50	1950 73	1973 80	1980 89	1900 89
Ecuador	2.5	1.6	0.0	3.6	2.9	3.3	-0.7	2.2
Argentina	2.5	0.9	-0.8	1.7	1.9	0.6	-2.5	0.9
Brazil	2.3	2.5	2.5	2.7	3.9	4.6	0.0	2.8
Chile	2.4	1.6	-0.9	1.7	1.2	1.8	1.2	1.3
Colombia	2.1	2.1	2.1	1.1	2.2	2.6	1.2	1.9
Mexico	1.8	0.1	0.1	2.5	3.2	3.6	-1.0	1.6
Venezuela	0.4	2.3	1.1	4.7	2.6	0.6	-2.4	1.7
Average	1.9	1.6	0.7	2.4	2.5	2.3	-0.6	1.7

Source: Hofman, 1994.

The 1938-50 period showed a recovery for all countries considered, except for Colombia. During this phase Venezuela had the highest growth rate of 4.7% while Ecuador was second, growing at an annual rate of 3.6%. The following phase, 1950-73, showed a disparity between the countries under consideration. Three countries, including Ecuador, showed a decrease in the growth rate and four countries improved their growth rate compared to the previous 1938-50 period. In the sixth phase, 1973-80, Ecuador improved its growth record from the 2.9% rate achieved in the previous phase to 3.3%. Two countries slowed down, namely Argentina and Venezuela, while the rest reached growth rates above those in the 1950-73 phase. The 1980s can be considered as a lost decade for all of the countries considered here. All countries slowed down. With the exception of Colombia and Chile this period was the worst for the Latin American countries in the twentieth century. In sum, Ecuador's growth record in this century has been fairly favourable in comparison to other Latin American countries but showed great instability.



Until the 1970s the economy of Ecuador depended on the exports of a few products, mainly coffee, cocoa and bananas. In the beginning of the 1970s Ecuador discovered and started to explore its oil resources. With the quadrupling of oil prices in 1973 the availability of oil resulted in large economic rents. Manufacturing developed rapidly on the basis of finance provided by rents from the oil industry. Later in this period a stimulus was provided by the inflow of capital from foreign debt. Thus Ecuador's manufacturing sector was stimulated by capital flows from exports or from international borrowing. For this reason the development of manufacturing is strongly linked to fluctuations in international prices of its exports of primary products and to the flow of capital originating from abroad.

The central focus of this study is the manufacturing sector of Ecuador. When analysing GDP by kind of economic activity the relative importance of the manufacturing sector in the economy of Ecuador becomes clear (see table 2.2).

Table 2.2  
Ecuador: GDP by Kind of Economic Activity (% Total GDP 1975 Prices) , 1970-1991

	1970	1980	1982	1984	1986	1988	1990	1991
1. Agriculture, hunting, forestry and fishing	25.0	14.4	14.9	14.0	15.8	16.7	17.2	17.6
2. Mining and quarrying	0.7	14.2	14.0	17.6	18.3	17.8	16.6	16.5
3. Manufacturing	12.8	14.2	15.0	14.5	12.9	12.5	10.6	10.7
4. Electricity, gas and water	0.8	0.8	0.8	1.2	1.3	1.5	1.6	1.6
5. Construction	6.3	4.7	4.7	4.2	4.0	3.4	3.0	2.8
6. Whole and retail trade	17.1	16.8	16.5	14.9	14.7	14.8	15.1	15.1
7. Transport, storage and communication	6.0	6.8	6.9	6.9	7.4	7.7	8.7	8.7
8. Finance, insurance, real estate and business services	12.0	12.0	12.0	11.2	11.0	12.9	10.9	11.0
9. Community, social and personal services	16.0	14.9	15.2	15.8	15.0	15.1	15.2	14.9
Less: Imputed bank service charges	2.0	3.4	3.4	2.9	2.9	4.8	2.7	2.9
Plus: Import Duties incl. Value added tax	5.5	4.8	3.5	2.4	2.5	2.3	3.7	4.1
Total: GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Statistical Yearbook for Latin America and the Caribbean, ECLAC, Santiago, 1992.

In the whole of the period 1970-91 manufacturing contributed a substantial part to total GDP. However, its relative importance declined from 12.8% of GDP in 1970 to 10.7% in 1991. In 1970 the most important sector was agriculture with a share of 25% in total GDP. In the period 1980-82 wholesale and retail trade was the most important sector. In the second half of the 1980s the mining and agricultural sectors were the most important sectors.

Ecuadorian manufacturing is characterised by a duality in the size of firms (see table 2.3). In 1987 47.7% of total employment in manufacturing were self employed persons whereas 19.3% and 7.3% of total employment in manufacturing worked in small and medium sized firms. Only 25.7% of total employment in manufacturing worked in large firms. These large firms are a fraction of the total number of firms, i.e. 0.3%. However, the main share of value added was produced in these large firms. The products of large firms are much more capital intensive than those of small firms, which are more labour intensive.

**Table 2.3**  
**Ecuador: Structure of Manufacturing in 1987**

Firm Size	% of Firms	% of Employment	% of Value Added
Self-employed	84.3	47.7	15.1
1-9	14.9	19.3	17.3
10-49	0.5	7.3	10.2
50+	0.3	25.7	57.4
Total	100.0	100.0	100.0

Source: World Bank Report No. 8411-Ecuador, 1990, page 25.

For an international perspective the development of the Ecuadorian manufacturing is analysed in comparison with six other Latin American countries. Table 2.4 shows the growth rates of GDP of the manufacturing sector for these seven countries. In case of Ecuador two features stand out. The average annual growth rate of manufacturing in the 1970-80 period was 10%, which was the highest of the countries in this sample. This can be explained by the fact that oil refineries are included.

**Table 2.4**  
**Growth Rates of Manufacturing Output for seven Latin American Countries**  
**(average annual rates), 1970-1991**

	1970 80	1980 85	1985	1987	1989	1990	1991
Argentina	1.6	-3.1	-10.0	1.8	-9.8	-0.9	12.7
Brazil	9.0	-0.6	-8.3	0.9	2.9	-9.5	-0.7
Chile	1.1	-1.4	-1.9	6.9	12.2	0.2	5.5
Colombia	6.0	1.2	-3.0	6.2	5.6	4.3	-0.5
Ecuador (a)	10.0	1.5	-1.1	1.4	-5.2	-8.6	5.1
Mexico	6.3	1.2	6.1	3.0	7.2	5.8	3.7
Venezuela	2.6	0.7	5.0	2.5	-11.8	6.1	11.4
Total Sample	5.2	-0.1	-1.9	3.2	0.2	-0.4	5.3
Total Latin America	5.7	-0.6	3.4	2.4	0.8	-2.5	3.5

(a) Includes Petroleum refineries which is given separately in the country's official statistics.

Source: Statistical Yearbook for Latin America and the Caribbean, ECLAC, Santiago, 1992.

In the 1980-85 period Ecuador also had the highest annual average growth rate. After 1985 this leading position was lost although 1991 showed a remarkably recovery from the slowdown in the previous 1985-90 period.

The share of manufacturing in total GDP shows a comparatively different position of Ecuador (see table 2.5).

Table 2.5  
Share of Manufacturing as % of total GDP (constant 1980 prices) for  
Seven Latin American Countries, 1970-1991

	1970	1980	1985	1987	1989	1990	1991
Argentina	30.7	27.9	26.0	27.2	25.5	25.2	26.5
Brazil	32.7	33.6	30.9	31.1	30.0	28.4	27.9
Chile	24.5	21.4	20.3	21.1	22.1	21.7	21.7
Colombia	22.1	23.3	21.7	21.7	21.6	21.7	21.1
Ecuador	15.9	17.7	17.2	17.3	14.9	13.5	13.6
Mexico	23.0	22.1	21.4	21.3	22.5	22.9	22.9
Venezuela	17.5	18.8	21.5	21.4	20.6	20.5	20.7
Total Sample	23.8	23.5	22.7	23.0	22.5	22.0	22.1
Total Latin America	25.7	26.0	24.7	25.2	24.7	24.0	24.0

Source: *Statistical Yearbook for Latin America and the Caribbean*, ECLAC, Santiago, 1992.

The share of manufacturing in total GDP of Ecuador grew from about 16% in 1970 to about 18% in 1980 and decreased to 13.5% in 1991. Of all countries in this sample the share of manufacturing in total GDP for Ecuador was by far the smallest in this period. Except for Venezuela all other countries had a manufacturing GDP share above 20% in 1970. In 1980 this situation was the same, while in the 1985-91 period even Venezuela reached a share above the 20%. An extremely high share of manufacturing in GDP can be observed for Argentina and Brazil. For both countries in 1970 the share of manufacturing in total GDP was about one third. For Brazil the share of manufacturing in total GDP remained at this level until 1989. The last two years show a slight decrease but in 1991 manufacturing in Brazil had a share of over one quarter of total GDP compared to only 13.6% for Ecuador.

The exports of manufacturing products excluding oil of Ecuador in the 1970-91 period measured as a percentage of total GDP were extremely low with a lower limit of only 0.8% of GDP in 1985 and an upper limit of only 3.1% of GDP in 1980 (note that a similar pattern can be observed when measuring the share of manufacturing as a percentage of total exports). For Brazil exports of manufacturing products became increasingly important in the 1970-91 period. Except for Mexico the exports of manufacturing products increased for all of the countries in 1980 as compared with 1970. In 1985 exports of manufacturing products kept growing except for Ecuador and Argentina. In the following four years, i.e. 1986-89, for five countries the export share of manufacturing products increased. Two countries, Mexico and Venezuela, first slowed down but also expanded their exports of manufacturing products. 1990 showed a relatively bad situation for all countries as compared with the previous year, but Colombia was able to improve its export position in manufacturing products.

Table 2.6  
Exports of Manufacturing Products as % of Total GDP (constant 1975 prices) for  
seven Latin American Countries, 1970-1991

	1970	1980	1985	1986(a)	1987(a)	1988(a)	1989(a)	1990(a)	1991(a)
Argentina	13.9	23.1	20.8	26.1	31.4	31.4	35.4	29.3	28.4
Brazil	15.4	37.2	43.9	48.1	49.7	52.7	53.6	51.8	54.9
Chile	4.1	8.9	11.1	8.5	8.7	9	10.1	9.8	11.4
Colombia	10.7	19.7	17.1	14.6	19.4	24	24.7	25.1	33.3
Ecuador	1.7	3.1	0.8	1.4	2.3	2.2	2.5	2.3	2.4
Mexico	32.5	11.3	20.6	45.7 (b)	38.1	44.7	47.2	43.6	--
Venezuela	1.2	1.7	9.9	7.3	6.1	7.5	13.5	10.7	--
Total Sample	11.4	15.0	17.7	21.7	22.2	24.5	26.7	24.7	18.6
Total Latin America	12.3	16.8	23.4	31.9	31.7 (c)	35.6	37.2 (d)	--	--

(a) Manufacturing as defined in ISIC, Rev. 2

(b) Estimates

(c) Excludes Nicaragua

(d) Excludes Honduras and Jamaica

Source: Statistical Yearbook for Latin America and the Caribbean, ECLAC, Santiago, 1992.

### III Methodology

The aim of this study is to make a comparison of real output and productivity between industries in Ecuador and the United States. In the first step of the procedure, unit value ratios of matched products for the sample industries are used to derive purchasing power parities. For every binary comparison there are two PPPs, i.e. one at quantity weights of Ecuador and one at quantity weights of the US. In formulas:

(1)

$$PPP_j^{EU(E)} = \frac{\sum_{i=1}^n (P_{ij}^E * Q_{ij}^E)}{\sum_{i=1}^n (P_{ij}^U * Q_{ij}^E)}$$

(2)

$$PPP_j^{EU(U)} = \frac{\sum_{i=1}^n (P_{ij}^E * Q_{ij}^U)}{\sum_{i=1}^n (P_{ij}^U * Q_{ij}^U)}$$

where  $PPP_j^{EU(E)}$  is the PPP of the sucre versus the dollar in industry  $j$  at quantity weights of Ecuador,  
 $PPP_j^{EU(U)}$  is the PPP of the sucre versus the dollar in industry  $j$  at quantity weights of the United States and  $i = 1 \dots n$  is the sample of matched items.

Only those products are matched for which the description in the censuses of Ecuador and the US are consistent. Basically there are three possible approaches to the matching procedure. The first is the "maximalist" approach. In this approach as many products as possible are matched. The second, "minimalist", approach is the opposite of this. In this approach product items are ranked according to the total value of output of the industry in either country. After this the average value can be calculated for all items which contribute more than 1 per cent to the total value of output of the industry. The output ratios and PPPs can now be calculated on the basis of these average unit values for each country. However, this approach abandons some of the essential elements of accurate matchings. The product items matched are not chosen on basis of their function or method of production but by reference to their relative importance in gross output. The third method was developed by Maddison, van Ark and Blades and is denominated as the "A-B-M" approach. The essential feature in this approach is that a minimum of items are matched with a maximum of coverage. The matching is confined to the most important products but each item in one country is individually matched with a corresponding item in the other country.

In this study the product listings for most of the sample industries for the United States are based upon the product listings as published in Szirmai and Pilat, 1990. They selected their products from the US census 1977 but provided product listings in order to facilitate an "A-B-M" approach of matching. For Ecuador the products are selected from the census in a way to make as many matches as possible, which therefore is a "maximalist" approach. This study therefore uses a combination of features of the "A-B-M" approach and the "maximalist" approach.

For the USA no detailed census data were available for 1980. The matchings of the products are based on the 1977 census. In order to put the resulting PPPs on a 1980 basis the PPPs are divided by a 1980/1977 US price ratio. The *Annual Survey of Manufactures 1980-81 (ASM)* provides data on output values in current prices for 1980. However, it contained no information on output quantities. For volume adjustments of 1977 census data to 1980, detailed indices of shipments in constant 1972 dollars from the *1984 US Industrial Outlook* are used. This gave 1980 output quantities at 1977 prices. Dividing 1980 output values from the ASM by 1980 quantities at 1977 prices gives then the required 1980/1977 price ratios. Equations (1) and (2) can now be reformulated as:

(3)

$$PPP_j^{EU(E)} = \frac{\sum_{i=1}^n (P_{ij}^{E80} * Q_{ij}^{E80})}{\sum_{i=1}^n (P_{ij}^{U80} * Q_{ij}^{E80})}$$

this results in:

$$= \frac{\sum_{i=1}^n (P_{ij}^{E80} * Q_{ij}^{E80})}{\sum_{i=1}^n (P_{ij}^{U77} * Q_{ij}^{E80}) * P_j^U}$$

(4)

$$PPP_j^{EU(U)} = \frac{\sum_{i=1}^n (P_{ij}^{E80} * Q_{ij}^{U80})}{\sum_{i=1}^n (P_{ij}^{U80} * Q_{ij}^{U80})}$$

this results in:

$$= \frac{\sum_{i=1}^n (P_{ij}^{E80} * Q_{ij}^{U77}) * Q_j^U}{\sum_{i=1}^n (P_{ij}^{U77} * Q_{ij}^{U77}) * P_j^U * Q_j^U}$$

where  $P_j^U$  is 1980 producer price index for industry j in the United States (1977 = 1.00)  
 $Q_j^U$  is 1980 US quantity index for industry j in the United States  
 $i = 1 \dots n$  is the sample of matched items

For this study 16 sample industries have been selected. For each of these 16 industries matches have been made. The products which were necessary to make these matches were selected from the Industrial Censuses of the USA and Ecuador. The selection of the products has been made with a "maximalist" approach for Ecuador and the "A-B-M" approach for the USA. The resulting PPPs from these matches are used to convert the gross value of output and value added per industry of Ecuador into US dollars in order to make real output and value added comparisons. The 16 sample industries are distributed over 11 branches. It is assumed that the PPPs calculated for these 16 sample industries also represent the PPPs for the branch to which the sample industries belong. If a branch is represented by a single sample industry the branch PPP equals the sample industry PPP. Where there was more than one sample industry per branch, the branch PPP is calculated as the weighted average of sample industry PPPs. To do this the value added figures of the sample industry are used as weights. Ultimately, the branch PPPs are

applied to branch value added figures. This makes it possible to transform value added by manufacturing branch into the currency of the other country<sup>2</sup>.

#### IV Data

The primary source for the data of the United States is the *1977 Census of Manufactures*, published by the Bureau of the Census of the US Department of Commerce<sup>3</sup>. The data for Ecuador are derived from *Censos Economicos 1980* published by Instituto Nacional de Estadística y Censos (INEC), Quito, December 1980. Before this census two other censuses have been produced, one in 1957 (for the year 1955) and one in 1965 (for the year 1964). Between 1966 and 1979 an economic survey was held every year but no census was produced. After 1980 economic surveys were produced but no new census has yet been produced.

The census of 1980 consists of eight volumes and is rather detailed. It categorises products and industries according to the International Standard Industrial Classification (ISIC, UN 1971). For this study the second and eight volumes have been used in particular. The second volume is a national summary for all establishments with one or more employees. It provides all the necessary data on labour input, gross production, intermediate consumption, value added and indirect taxes and subsidies. Table 5A of this volume (page 105 and following) summarises the data on gross production for the manufacturing industry. Besides gross production this table also gives the "gross production of articles for sale". Table 4.1 provides the figures and shows the relationship between these two categories of production.

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<sup>2</sup> An important problem in the "industry of origin" approach is "double deflation". Despite the fact that some studies which analyze manufacturing with this approach have used double deflation, only a few of these studies have been able to find separate PPPs for inputs as well as for gross output (for exceptions see van Ark, 1993). PPPs resulting from double deflation can vary substantially for particular branches of industry and therefore this method should be preferred. However, due to the lack of data in this study it was not possible to achieve double deflation at any level. Thus throughout all the steps in the procedure in this study one should note that it has been assumed that PPPs for output equal PPPs for inputs and therefore also PPPs for value added.

<sup>3</sup> For a detailed description of the US data used in this study see: Szirmai and Pilat 1990 or van Ark, 1993.

Table 4.1  
Ecuador 1980 : Total Production, Intermediate Consumption,  
Value Added and Total Production of Articles for Sale  
(thousands of sucres)

	1	2	3	4	5
	Total Production	Interme- diate Consumption	Value Added at Producers' Prices	Total Production of Articles for sale	Ratio of Column 4 to 5
Food, Beverages and Tobacco	38,635,197	26,906,621	11,728,576	35,522,658	91.9
Textile, Wearing Apperal and Leather	13,479,940	7,194,923	6,285,017	11,955,808	88.7
Wood and Wood Products	5,222,576	2,451,264	2,771,312	4,653,651	89.1
Paper and Paper Products, Printing and Publishing	6,472,672	4,202,691	2,269,981	5,252,742	81.2
Chemicals, Petroleum, Coal, Rubber and Plastics	14,259,437	8,985,169	5,274,268	12,461,828	87.4
Non Metallic Mineral Products	5,596,762	2,342,130	3,254,632	5,193,979	92.8
Basic Metals	3,067,001	2,315,284	751,717	2,898,102	94.5
Fabricated Metal Products, Machinery and Equipment	13,785,545	8,565,879	5,219,666	12,524,970	90.9
Other Manufacturing	1,130,864	621,225	509,639	796,074	70.4
Total Manufacturing	101,649,994	63,585,186	38,064,808	91,259,812	89.8

Table 3 in volume 8 of the census (page 223 and following) specifies product information. This is done on the basis of 3 and 8 digit ISIC classification ('gross production of articles for sale'). Besides that, volume 8 also gives product information on 3 and 8 digit CIBS (a specific code for Ecuador). However, this is done without giving consideration to the classification of the activity of the establishment which produced the product. For this reason this detailed product information does not correspond with volume 2 and is therefore not used for this study.

On closer inspection the listings of products in table 3 of volume 8 include primary and secondary products. This means that in some cases products are specified in more than one industry. To achieve a complete and consistent product listing with the US census a reclassification of the products has been made. Thus all information on one product, if it is specified in more than one industry, has been used for the matching procedure. Although this reclassification was time consuming there was a practical argument. Without the reclassification it was almost impossible to find a representative group of comparable products.

For a match it is necessary that besides the ISIC code, quantity, value and a unit for the product are specified. There were two problems with the product specification in the census of Ecuador. Firstly, the units specified were not always consistent with the units as specified in the US census. Secondly, besides quantity and value of production for own account, for some products also data for account of thirds are specified. However, it is not stated whether these are quantities or values. Besides that, only one of the two necessary indicators would have been available. For this reason this information has not been used.

The US census concept of value added equals gross value of shipments minus raw materials, semi-finished goods, parts, fuels, electric energy and contract work. Census value added does not exclude most purchased services as is done in the national accounts. The gross value of shipments is net of sales and excise taxes. The value added concept in the census of Ecuador is quite different. Basically, it is the difference between gross production and all intermediate consumption (see table 4.2). However, this intermediate



consumption contains costs which should not be subtracted from the gross production to make it comparable with the value added concept of the United States. Fortunately the census of Ecuador provides sufficient information to make the value added concept consistent with the US value added concept (see table 4.3).

Table 4.2  
Ecuador: US value added concept  
(thousands of sucres)

Branches	1 Total Production	2 Total Intermediate Consumption	3 Value Added US Concept	4 Value Added Census Ecuador	5 Ratio 3 to 4	6 Net Indirect Taxes
Food, Beverages and Tobacco	38,635,197	24,985,398	13,649,799	11,728,576	116.38	1,129,402
Textile, Wearing Apperal and Leather	13,479,940	6,652,447	6,827,493	6,285,017	108.63	194,857
Wood and Wood Products	5,222,576	2,126,869	3,095,707	2,771,312	111.71	(11,742)
Paper and Paper Products						
Printing and Publishing	6,472,672	3,817,768	2,654,904	2,269,981	116.96	89,382
Chemicals, Petroleum, Coal, Rubber and Plastics	14,259,437	7,938,095	6,321,342	5,274,268	119.85	214,619
Non Metalic Mineral Products	5,596,762	2,001,854	3,594,908	3,254,632	110.46	178,849
Basic Metals	3,067,001	2,183,408	883,593	751,717	117.54	88,413
Fabricated Metal Products, Machinery and Equipment	13,785,545	7,681,999	6,103,546	5,219,666	116.93	192,588
Other Manufacturing	1,130,864	574,534	556,330	509,639	109.16	13,451
Total Manufacturing	101,649,994	57,962,372	43,687,622	38,064,808	114.77	2,089,819

Table 4.3  
Ecuador 1980: Components of Intermediate Consumption  
(thousands of sucres)

	1 Energy	2 Water	3 Fuels	4 Raw Materials	5 Contract Work	6 Costs of Articles Sold Without Transformation	7 Total Interm. Cons. sum 1-6
Food, Beverages and Tobacco	256,982	115,761	278,871	22,785,181	36,852	1,511,751	24,985,398
Textile, Wearing Apperal and Leather	178,838	13,320	63,659	6,013,244	145,542	237,844	6,652,447
Wood and Wood Products	57,307	3,406	32,369	1,934,714	27,024	72,049	2,126,869
Paper and Paper Products, Printing and Publishing	55,579	3,662	34,269	3,468,081	34,568	221,609	3,817,768
Chemicals, Petroleum, Coal, Rubber and Plastics	109,604	13,806	84,760	6,921,453	23,605	784,867	7,938,095
Non Metalic Mineral Products	173,497	10,163	148,047	1,522,564	85,777	61,806	2,001,854
Basic Metals	31,416	2,247	14,868	2,020,954	1,066	112,857	2,183,408
Fabricated Metal Products, Machinery and Equipment	80,621	8,682	49,789	6,952,456	125,537	464,914	7,681,999
Other Manufacturing	4,549	267	1,520	423,106	4,392	140,700	574,534
Total Manufacturing	948,393	171,314	708,152	52,041,753	484,363	3,608,397	57,962,372

An underestimation of about 15% of the total value added of manufacturing of Ecuador would have been the result if the value added concept as specified in the census of Ecuador would not have been made consistent with the value added concept of the USA.

The comparison of real labour productivity in manufacturing between Ecuador and the US depends also on an accurate estimate of labour input. As in the case of value added, the figures on labour input should be comparable between Ecuador and the United States. The census sources only supply information on number of persons engaged. No census information was available on hours worked. In both countries the census employment figures are exclusive of head offices and auxiliary employment. Table 4.4 gives labour input for Ecuador. The column which specifies the total number of employment is used. However, all the other categories are also specified.

Table 4.4  
Ecuador: Labour Input in the Manufacturing Sector 1980  
(in persons)

ISIC Code	Total Persons Engaged	Owners and Business Associates	Family Workers	Total Employees and Workers
Food, Beverages and Tobacco	46,221	3,554	2,735	39,932
Textile, Wearing Apparel and Leather	52,074	15,831	6,221	30,022
Wood and Wood Products	24,079	6,671	2,695	14,713
Paper and Paper Products				
Printing and Publishing	9,498	702	469	8,327
Chemicals, Petroleum, Coal, Rubber and Plastics	14,842	194	88	14,560
Non Metallic Mineral Products	10,969	1,553	841	8,575
Basic Metals	1,995	31	6	1,558
Fabricated Metal Products, Machinery and Equipment	24,679	2,867	1,384	20,428
Other Manufacturing	3,292	1,038	569	1,685
Total Manufacturing	187,249	32,441	15,008	139,800

For the Ecuador-US comparison in this study the basic sources are the production censuses. These sources are used to estimate the purchasing power parities which are used to convert output from one currency to another. It is also possible to apply these PPPs to national accounts estimates of output which usually give a more complete account of national product than the census does. The update of the productivity levels between Ecuador and the United States is essentially based on time series from the national accounts. The reason for this is that the census only provides information for the base year and not for other years. It is therefore important to look at the relationship between the census and the national accounts. In general, national accounts production figures include the informal sector, whereas the census excludes this sector. For manufacturing value added the census accounts for almost 74 per cent of the value added as specified in the national accounts (1980). The national accounts is therefore primarily based on the census.

V

**Comparisons of Purchasing Power Parity -  
Real Output and Labour Productivity in Ecuador and the USA for 1980**

It was not possible to make matches for all industries of Ecuador and the United States. Therefore some sample industries had to be selected. This selection was based on the data for Ecuador. Obviously the goal was to make matches for a substantial part of the manufacturing sector. Table 5.1 presents the ranking of manufacturing branches in terms of gross production. The final column of the table states if matches were made for the branches under consideration. The branches for which matches have been made cover a large proportion of total gross production, approximately 71.3%.

Table 5.1  
Ecuador: Ranking according to Total Production

No.	ISIC Code	Total Production	Percentage Matching of Total Production
Total Manufacturing		101,649,994	100.00
1	Food	30,011,138	29.52 Yes
2	Textiles	8,467,117	8.33 Yes
3	Fabricated Metal Products	6,768,540	6.66
4	Beverages	6,561,423	6.45 Yes
5	Other Chemical Products	5,791,689	5.70 Yes
6	Non Metallic Mineral Products	4,822,400	4.74 Yes
7	Electrical Machinery	4,617,617	4.54 Yes
8	Paper & Paper Products	3,752,157	3.69 Yes
9	Wearing Apperal	3,077,920	3.03 Yes
10	Printing & Publishing	2,720,515	2.68
11	Furniture & Fixtures	2,689,565	2.65
12	Iron & Steel	2,571,186	2.53
13	Wood & Wood Products	2,533,011	2.49
14	Industrial Chemicals	2,528,503	2.49
15	Plastics	2,298,787	2.26
16	Tobacco	2,062,636	2.03 Yes
17	Transport Equipment	2,046,325	2.01
18	Petroleum Refineries	1,792,385	1.76
19	Rubber Products	1,384,635	1.36 Yes
20	Footwear	1,306,053	1.28 Yes
21	Other Manufacturing	1,130,864	1.11
22	Leather & Leather Products	628,850	0.62 Yes
23	Non ferrous Metal Basic	495,815	0.49
24	Glass & Glass Products	485,664	0.48
25	Miscellaneous Products	463,438	0.46
26	Pottery	288,698	0.28
27	Machinery except electrical	223,858	0.22
28	Professional & Scientific Instruments	129,205	0.13

## Results for Sample Industries<sup>4</sup>

In this study 58 product matches could be made involving 78 products in case of Ecuador and 205 products in case of the United States. The basic census data on gross value of output, gross value added and employment are presented in table 5.2. Coverage ratios are listed in table 5.3. Fabricant (1940) has suggested that 40% should be a minimum sample size for the construction of reliable price indices. Obviously, some industries in this study do not fulfill this requirement. Therefore one has to be careful using the resulting price relatives from the industries with a low coverage ratio.

Table 5.2  
Gross Value of Output, Gross Value Added and Employment in Sample Industries  
in Ecuador and the USA, 1977 and 1980  
(national currencies and number of persons)

Sample Industries:	--- Ecuador (1980) ---			--- USA (1977 and 1980) ---			
	Gross Output	Gross Value Added	Persons Employed	Gross Value of Output 1977	Gross Value of Output 1980	Gross Value Added 1980	Persons Employed 1980
	(mill. Sucres)	(mill. Sucres)		(mill. US \$)	(mill. US \$)	(mill. US \$)	
1 Dairy Products	1,660.2	334.5	1,772	26,009.8	33,930.1	7,476.8	149,300
2 Fats and Oils	3,837.0	990.5	2,292	14,480.0	18,237.2	2,822.6	42,500
3 Grain Mill Products	5,066.3	1,245.4	3,097	4,946.7	6,652.9	1,514.4	21,100
4 Sugar & Sugar Factories	3,329.4	2,044.8	9,686	2,964.0	5,596.8	1,574.5	16,700
5 Confectionery Products	3,089.9	767.7	1,646	1,629.2	2,026.7	813.9	9,800
6 Malt, Malt Beverages and Wine	897.4	564.1	417	8,514.4	11,404.1	4,312.0	54,000
7 Tobacco and Tobacco Products	2,062.6	1,278.3	1,191	6,377.4	9,055.9	5,386.9	39,300
8 Textile Yarn and Cloth	5,764.4	2,655.2	10,901	4,695.5	5,007.3	1,921.1	97,000
9 Men's Clothing	3,077.9	1,716.7	21,860	12,127.1	13,915.0	7,491.5	415,200
10 Footwear and Leather Products	1,933.0	954.0	10,384	5,206.7	5,993.5	2,903.2	141,300
11 Pulp and Paper	1,821.8	799.7	1,719	21,828.7	31,230.2	12,825.2	210,300
12 Paints	1,031.6	386.1	639	6,629.7	8,340.0	3,559.2	62,300
13 Tires and Inner Tubes	1,039.5	507.8	787	8,971.0	4,589.0	4,075.6	87,200
14 Bricks	3,331.4	1,991.3	7,989	2,174.0	2,350.8	1,260.7	47,600
15 Cement	1,491.0	1,110.4	914	3,526.5	4,447.0	2,337.6	36,300
16 Radio and TV Receivers	585.9	314.5	934	5,732.6	6,798.8	2,705.2	65,000
<hr/>							
Total in sampled Industries	40,019.3	17,660.7	76,228	135,813.3	169,575.3	62,980.4	1,494,900
Total Manufacturing	101,650.0	43,687.6	187,249	1,358,526.4	1,850,899.0	73,441.0	20,644,000
Sample as % of Total:	39.37	40.42	40.71	10.00	9.16	8.14	7.24

Source: Figures for Ecuador from Censos Economicos 1980 and for USA (1977) from 1977 Census of Manufactures; USA (1980) from Annual Survey of Manufactures 1980-81.

<sup>4</sup> For the results for oil refineries see annex III.

**Table 5.3**  
Coverage Ratio: Gross Value of Matched Output as percentage of  
Total Gross Value of Output in Sample Industries

Branch & Sample Industries within the Branch	Ecuador 1980	USA 1977
<b>FOOD MANUFACTURING</b>		
1 Dairy Products	63.6	57.4
2 Fats and Oils	72.9	26.4
3 Grain Mill Products	38.6	23.4
4 Sugar and Sugar Factories	35.1	63.3
5 Confectionery Products	56.5	15.6
<b>BEVERAGES</b>		
6 Malt, Malt Beverages and Wine	69.0	93.0
<b>TOBACCO PRODUCTS</b>		
7 Tobacco and Tobacco Products	50.5	95.6
<b>TEXTILE MILL PRODUCTS</b>		
8 Textile Yarn and Cloth	20.1	96.7
<b>WEARING APPAREL</b>		
9 Men's Clothing	44.9	74.7
<b>LEATHER PRODUCTS AND FOOTWEAR</b>		
10 Footwear and Leather Products	61.4	62.6
<b>PAPER PRODUCTS, PRINTING AND PUBLISHING</b>		
11 Pulp and Paper	39.1	47.2
<b>CHEMICALS AND COAL PRODUCTS</b>		
12 Paints	66.2	21.8
<b>RUBBER AND PLASTIC PRODUCTS</b>		
13 Tires and Inner Tubes	13.4	24.1
<b>NON-METALLIC MINERAL PRODUCTS</b>		
14 Bricks	21.3	39.0
15 Cement	88.5	69.3
<b>ELECTRICAL MACHINERY AND EQUIPMENT</b>		
16 Radio and TV Receivers	75.9	7.3
Weighted average 16 industries (b)	45.3	51.9
As % of Total Manufacturing	17.8	5.2

(b) Weights are based on gross value of output in national currencies  
(see table 5.2).

Source: Derived from table 5.2.

Binary productivity comparisons were first made at the lowest level of aggregation, the sample industry. It is important to note that for every sample industry an adjustment has been made for excise duties. For this purpose the ratio of gross value of output to gross value of output minus net indirect taxes was used (see annex for ratios and matching tables). The focus of this study is primarily at higher levels of aggregation than the sample industry level. Therefore the sample industry results will not be discussed at length. Below an example of one sample industry, dairy products, is shown to explain the various steps before reaching the branch level (see table 5.4).

Table 5.4  
Results for Sample Industry Dairy Products

Step 1	At Ecuador "prices"			At US "prices"		
	Ecuador 1980	USA 1977	Ecuador/ USA	Ecuador 1980	US 1977	Ecuador/ USA
Gross Value of Matched Output	1056.1	474,882.0	0.2	43.7	14,940.1	0.3
Step 2	At Ecuador "prices"			At US "prices"		
	Ecuador 1980	USA 1980	Ecuador/ USA	Ecuador 1980	US 1980	Ecuador/ USA
Gross Value of Matched Output	1056.1	465,099.4	0.2	58.2	19,490.3	0.3
Step 3	US Quantity Weights	Ecuador Quantity Weights	Geometric Average			
Purchasing Power Parity	23.9	18.1	20.8			
Step 4	At Ecuador "prices"			At US "prices"		
	Ecuador 1980 (1980 Sucre Million)	USA 1980	Ecuador/ USA	Ecuador 1980 (1980 US\$ Million)	US 1980	Ecuador/ USA
Gross Value Added	334.5	178,420.1	0.2	18.4	7,476.8	0.2
Step 5	At Ecuador "prices"			At US "prices"		
	Ecuador 1980 (1980 Sucre)	USA 1980	Ecuador/ USA (%)	Ecuador 1980 (1980 US\$)	US 1980	Ecuador/ USA (%)
Gross Value Added Per Employee	188,751.7	1,195,044.1	15.8	10,403.3	50,079.0	20.8

The first step shows gross value of matched output in 1980 both in national currency units and in prices of the other country. The basic US census data in this first step are based on the 1977 data. The 1977 data are adjusted to the 1980 basis by applying 1977-80 volume and price indices. This gives the adjusted gross value of matched output shown in step 2. Comparison of the value of matched output of Ecuador and the United States in the national currency with its value in the currency of the other country results in sample industry PPPs. Two sets of PPPs are calculated, one at quantity weights of the USA (23.9) and one at quantity weights of Ecuador (18.1). The geometric average of these two PPPs is about 17% lower than the exchange rate of 25 sucres to dollar. Applying the PPPs to gross value added figures in national currency from table 5.2 gives the real value added comparison (step 4). Finally, dividing gross value added by the number of persons employed gives the real labour productivity comparison. Labour productivity in Ecuador for dairy products manufacturing is at a level of 16% of the USA using Ecuador price weights and 21% using US price weights. This difference is primarily a reflection of the difference in production structure between the two countries.

### Results for Branches

The PPPs for 11 major branches are presented in table 5.5. The PPP for each branch is the weighted average of the PPPs of the sample industries belonging to that branch. The weights are the sample industry values added in national currency. If a branch is only represented by a single sample industry the PPP for the sample industry is taken as the PPP for the whole branch.

Table 5.5  
Purchasing Power Parities by Major Manufacturing Branch  
Ecuador/USA (Sucre to the US\$), Adjusted for Excise Duties

	PPP: Sucre/US\$		Geometric Average	Rel. Price Level
	US Quantity Weights	Ecuador Quantity Weights		
1 Food Manufacturing	28.0	19.4	23.3	93.2
2 Beverages	46.2	47.1	46.6	186.4
3 Tobacco Products	27.8	27.8	27.8	111.2
4 Textile Mill Products	41.3	40.5	40.9	163.6
5 Wearing Apparel	28.7	16.6	21.8	87.2
6 Leather Products and Footwear	19.5	13.6	16.3	65.2
7 Paper Products, Printing and Publishing	50.5	47.5	49.0	196.0
8 Chemicals and Coal Products	91.5	93.3	92.4	369.9
9 Rubber and Plastic Products	13.2	18.0	15.4	61.6
10 Non-metallic Mineral Products	31.6	39.1	35.1	140.4
11 Electrical Machinery and Equipment	36.9	79.9	54.2	216.8
12 PPP for Covered Manufacturing	28.9	45.9	36.4	145.6
Exchange Rate	25.0	25.0	25.0	100.0

Source and note:

PPPs from table Annex 11.5. The PPP for branches are weighted averages (sample industry value added weights) of the industries belonging to that branch. Sample industry value added weights from table 5.2.

Applying the branch PPPs to branch value added gives the real output comparisons. Subsequently the real output results are divided by the labour input data which gives the real labour productivity comparisons. Table 5.6 presents the results of the real output comparisons.

Table 5.6  
Gross Value Added (Census Concept), by Major Manufacturing  
Branch, Ecuador/USA, 1980

	at Ecuador "prices"		Ecuador/ USA	at US "prices"		Ecuador/ USA
	Ecuador 1980 (1980 Sucre million)	USA 1980 (million)		Ecuador 1980 (1980 US\$ million)	USA 1980 (million)	
	(1)	(2)	(3)	(4)	(5)	(6)
1 Food Manufacturing	9,582.2	2,112,044.7	0.45	494.2	75,302	0.66
2 Beverages	2,789.3	624,197.2	0.45	59.2	13,519	0.44
3 Tobacco Products	1,278.3	171,319.7	0.75	45.9	6,157	0.75
4 Textile Mill Products	4,156.3	786,193.3	0.53	102.5	19,056	0.54
5 Wearing Apparel	1,716.7	671,764.0	0.26	103.2	23,426	0.44
6 Leather Products and Footwear	954.5	94,449.0	1.01	70.4	4,851	1.45
7 Paper Products, Printing and Publishing	2,654.9	3,742,709.1	0.07	55.9	74,063	0.08
8 Chemicals and Coal Products	3,791.9	6,962,438.9	0.05	40.7	76,055	0.05
9 Rubber and Plastic Products	1,689.2	297,685.9	0.57	93.6	22,569	0.41
10 Non-metallic Mineral Products	3,594.9	759,904.7	0.47	92.0	24,051	0.38
11 Electrical Machinery and Equipment	1,932.1	2,695,634.8	0.07	24.2	73,150	0.03
12 Machinery and Transport Equipment (a)	798.3	2,209,254.6	0.04	17.4	76,482	0.02
13 Wood Products, Furniture and Fixture (a)	3,095.7	858,201.3	0.36	67.5	29,710	0.23
14 Basic and Fabricated Metal Products (a)	4,062.3	3,048,535.6	0.13	88.5	105,537	0.08
15 Other Manufacturing Industries (a)	623.0	1,173,260.3	0.05	13.6	40,617	0.03
Total Manufacturing	43,687.6	26,207,593.2	0.17	1,369	664,545	0.21

(a) For the branches 12 - 15 no PPPs could be calculated.  
For these branches the PPP for covered manufacturing was used instead.

From table 5.6 it becomes clear that Ecuador's manufacturing sector is rather small as compared with the manufacturing sector of the United States. Total real output of Ecuador's manufacturing sector is only 0.17% using Ecuadorian prices and 0.21% using US prices. Within Ecuador's manufacturing only one branch, leather products and footwear, has a real output level of over one percent of that of the United States. All other Ecuadorian branches have got a real output level lower than one percent as compared with the branches in the United States.

For the industries belonging to the first 11 branches matches have been made and a PPP has been calculated. This PPP is used as a conversion factor for gross value added in national currencies. For the other four branches, i.e. machinery and transport equipment, wood products, furniture and fixtures, basic and fabricated metal products and other manufacturing industries, no matches could be made. The reason for this was the lack of data to make sufficient and consistent product matches. However, on the basis of the other 11 branches an average PPP was calculated. This average PPP, 28.9 sucres to the US\$ with Ecuador price weights and 45.9 with US price weights, was used for the remaining 4 branches.

Table 5.7 gives the final productivity results.

Table 5.7  
Gross Value Added (Census Concept) per Person Engaged  
by Major Manufacturing Branch, Ecuador/USA, 1980

	at Ecuador "prices"			at US "prices"			Geometric Average of Col. 3 & 6
	Ecuador 1980 (1980 1000	USA 1980 Sucre)	Ecuador/ USA (%)	Ecuador 1980 (1980 US\$)	USA 1980 (US\$)	Ecuador/ USA (%)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 Food Manufacturing	243	1,374	17.7	12,540	48,993	25.6	21.3
2 Beverages	496	3,169	15.7	10,537	68,624	15.4	15.5
3 Tobacco Products	1,073	2,954	36.3	38,576	106,155	36.3	36.3
4 Textile Mill Products	210	962	21.8	5,174	23,324	22.2	22.0
5 Wearing Apparel	79	514	15.3	4,722	17,923	26.3	20.1
6 Leather Products and Footwear	92	407	22.6	6,767	20,909	32.5	27.0
7 Paper Products, Printing and Publishing	280	1,962	14.3	5,887	38,817	15.2	14.7
8 Chemicals and Coal Products	457	7,281	6.3	4,894	79,530	6.2	6.2
9 Rubber and Plastic Products	317	423	74.8	17,557	32,104	54.7	64.0
10 Non-metallic Mineral Products	328	1,240	26.4	8,390	39,235	21.4	23.8
11 Electrical Machinery and Equipment	387	1,373	28.2	4,841	37,264	13.0	19.1
12 Wood Products, Furniture and Fixture	129	733	17.5	2,801	25,371	11.0	13.9
13 Machinery and Transport Equipment	203	1,247	16.3	4,425	43,186	10.3	12.9
14 Basic and Fabricated Metal Products	260	1,124	23.1	5,665	38,900	14.6	18.4
15 Other Manufacturing Industries	172	1,123	15.3	3,753	38,868	9.7	12.2
Total Manufacturing	233.3	1,542.4	15.1	7,310.2	39,110.9	18.7	16.8

In 1980 average value added per person engaged in Ecuador's manufacturing was 16.8% of the US level (geometric average). With US prices it was 18.7% and with Ecuador prices it was 15.1%. With the exception of chemicals and coal products, which has an extreme low level of 6.2% (geometric average), all branches have productivity levels above 12% of the United States. The highest level of value added per person engaged was found in rubber and plastic products (64%). It is possible that with a correction for the quality of the products used for the matches in this branch the level will

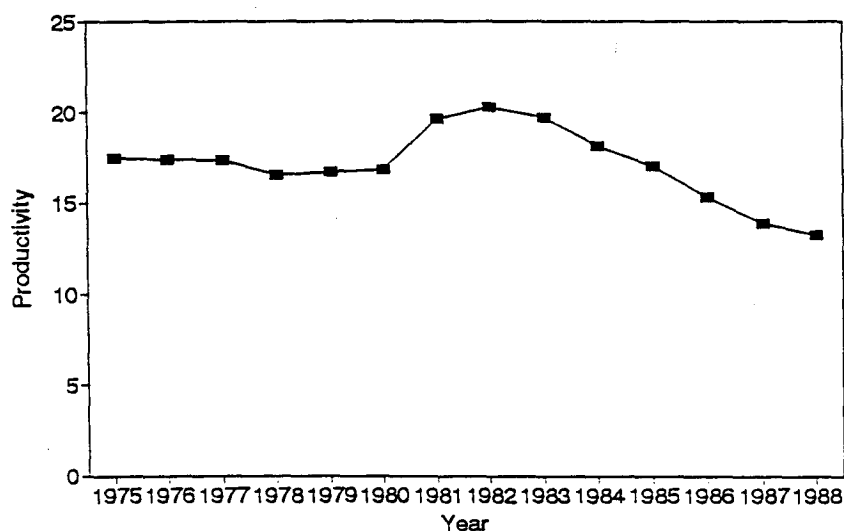


drop. However, due to the lack of information this was not yet possible. For all four branches for which the average PPP has been used average output per person engaged was between 12% and 20% (geometric average) of that of the US level. Three other branches, namely beverages (15.5%), paper products, printing and publishing (14.7%) and electrical machinery & equipment (19.1%), also have a labour productivity level within this range. Four branches have a labour productivity level of about 20% of the United States, i.e. food manufacturing (21.2%), textile mill products (21.9%), wearing apparel (20.1%) and non-metallic products (23.8%). Average output per person engaged in Ecuador was reasonably high for tobacco products (36.4%) and leather products & footwear (27.1%) as compared to the United States.

### Updating Results

The benchmark year for this study is 1980. This implies that the productivity results refer only to 1980. However, it is interesting to assess how the relative productivity level developed over time. Volume indices of gross value added and labour input have been applied to the 1980 comparison to calculate the trend for relative productivity. For Ecuador these indices have been based on the national accounts, for gross domestic product, and on ILO publications for labour input. Graph 1 presents the trend of the relative labour productivity level, for the period 1975-1988.

**Graph 1**  
Gross Value Added per Person Engaged  
(USA = 100), 1975 - 1988



Before 1980 the labour productivity level of Ecuadorian manufacturing was stable at about 17 per cent of that of the USA. After 1980 there was an improvement in the level with a peak of a little over 20 per cent in 1982. After 1982 labour productivity of Ecuador's manufacturing sector strongly declined to about 14 per cent of the level of the USA. This remarkable decline could be explained by the fact in the 1970s Ecuador's manufacturing was stimulated by economic rents flowing from the exports of oil and international borrowing. During the 1975-82 period international borrowing increased and oil exports remained more or less stable. However, capital transfers stopped after the Mexican debt crisis of September 1982.

## VI Summary and Conclusions

The main objective of this study was to estimate and to compare labour productivity in manufacturing of Ecuador with that of the United States. The Ecuadorian manufacturing sector is small in comparison with that of the United States but it can be considered as one of the most important activities in these economies. Productivity levels in this sector have been used as an indicator for the relative positions of these economies. Purchasing power parities for manufacturing have been generated to replace the exchange rate in a binary US-Ecuador comparison. For this I used the "industry of origin" framework as developed in the ICOP project at the University of Groningen.

When analysing the economic growth rate of Ecuador in the twentieth century it becomes clear that it has been fairly favourable in comparison to other Latin American countries but showed great instability.

Manufacturing in Ecuador has had a specific historical development. For a large part it was stimulated by capital flowing from the exports of primary products and international borrowing. In the 1970s this resulted in a high growth rate of manufacturing production with on average 10 percent a year. However, as a result manufacturing was strongly linked to fluctuations in international prices. The reduction of capital flows from the oil industry and international debt resulted in stagnation in the growth rates of Ecuador's manufacturing in the 1980s.

One of the main features of Ecuador's manufacturing sector is its duality in the size of firms. The main part of total value added (57.4%) of manufacturing is produced in firms with 50 or more employees. These large firms account for only 0.3% of the total number of firms.

The average annual growth rate of Ecuador's manufacturing sector in the 1970-85 period was the highest in Latin America. However, for the 1970-91 period the share of manufacturing in total GDP was the smallest, when compared with other Latin American countries. Exports of manufacturing products measured as a percentage of total GDP were extremely low in Ecuador. This share was substantially higher in the other Latin American countries in the 1970-91 period.

To put the manufacturing sector of Ecuador in a comparative perspective a productivity comparison with the United States was made. For that purpose 16 sample industries were selected. For each of these 16 industries price comparisons have been made. The 16 industries represent 11 major branches. For the remaining 4 branches an average PPP of covered manufacturing has been used as the conversion factor. A total of 58 product matches could be made involving 78 products in case of Ecuador and 205 products in case of the United States. The matched value of production accounted for almost 18 percent of total production of Ecuador and 5.2 per cent of that of the United States.

The PPPs for the individual branches differed substantially from the exchange rate. Using the geometric average only three branches, namely food manufacturing (23.3), leather products and footwear (16.3) and rubber and plastic products (15.4) had a PPP below the exchange rate of 25 sucres to the dollar. All other branches, including the overall PPP for covered manufacturing, were above the exchange rate. This implies that if the exchange rate should have been used for the productivity comparison it should have overstated real output and productivity levels.

In 1980 average value added per person employed in Ecuador's manufacturing sector was 17 per cent of the US level. With the exception of chemical and coal products all individual branches had a productivity level above 12 per cent of the United States. The highest level of output per person employed was found in rubber and plastic products (64%). The updating of results generally confirmed the conclusions from section two. From 1975 to the base year 1980 the labour productivity level of Ecuador's manufacturing sector was stable and at about 17 per cent of that of the United States. After 1980 the level first increased somewhat but after 1982 it strongly declined to about 14 per cent of the US level.

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## **Annex I**

### **Matching Tables**

Table 1.1 - Matching of Product Item, US Ecuador, Dairy Products (US 1977, Ecuador 1980)

United States Product Item	Unit (a)	US Quantity	US Dollar Value (mill. US\$)	US Dollar Unit Value (per ton) (mill. US\$)	US Quantity valued at Unit (mill. US\$)	PPP Sucr/US\$ US Quantity Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Sucr Value (1000 Sucr)	Ecuador Sucr Unit Value (per ton) (1000 Sucr)	Ecuador Quantity valued at US Unit Value (1000 US\$)	PPP Sucr/US\$ Ecuador Quantity Weights
1. 20201 Bulk fluid milk and cream:														
20201 12 Fluid whole milk, bulk value	ml. ltr.	4,720.4	1,088.5	0.2			31121100	liquid milk, processed	lt.	121,491,509	882,779	7.3		
20202 Packaged fluid milk and related products:							31121219	Fresh milk products fluid N.E.P.	lt.	325,033	5,293	16.3		
20202 12 Fluid whole milk, packaged	ml. ltr.	12,972.7	4,608.8	0.4										
		17,693.1	5,728.3	0.3	128,980.9	22.44				121,616,542	888,072	7.3	39,438.3	22.32
2. 20221 Natural cheese, except cottage cheese:														
20221 01 Natural cheese (cheddar, brick, gruyere, cream, Swiss, Italian, etc.) except cottage cheese	1000 bn	1,173.6	2,727.2	2.3										
20222 Process cheese and related products:														
20222 11 Process cheese		501.0	1,182.8	2.3										
20222 13 Cheese food		275.4	686.6	2.5										
20222 15 Cheese spread		123.5	271.0	2.2										
20222 19 Other related products cheese	1000 bn	188.1	384.3	2.3										
		2,243.6	5,233.9	2.3	176,529.8	33.72	31121711	cheese fresh	kg.	940,782	68,154	78.7	1,881.4	33.72
3. 20261 18 Fluid cream and buttermilk:														
20261 43 Cream, light (coffee cream, cooking cream, less than 30 percent butterfat)	1000 bn	622.3	705.0	1.1										
20261 45 Cream sour		21.8	17.1	0.8										
20261 46 Half and half		178.7	152.2	0.8										
20261 45 Whipped topping, packed at the butterfat base		223.5	130.8	0.6										
	1000 bn	94.9	82.2	0.8										
		1,132.0	1,080.3	0.9	54,073.8	51.00	31121811	Cream fluid fresh	kg.	387,878	18,533	47.8	383.4	51.00
4. 20210 Creamery butter:														
20210 13 Shipped in bulk (combines over 3 pounds)	1000 bn	321.4	886.1	2.2										
20210 15 Shipped in consumer packages (combines 3 pounds and under)		113.8	287.4	2.4										
20210 21 Anhydrous butterfat	1000 bn	7.0	16.7	2.7										
		442.2	882.2	2.2	36,201.3	36.86	31121800	Butter creamery	kg.	357,035	29,227	81.9	769.0	36.86
5. 20240 Ice cream and ice:														
20240 14 Shipped in bulk (3 gall. or more)	M. ltr.	598.2	300.2	2.2										
20240 15 Shipped in consumer sizes		1,976.5	1,028.4	2.0										
20240 16 Novelty forms		534.4	325.7	2.4										
20240 51 Wilder ice		114.7	80.8	2.0										
20240 71 Melonite and similar frozen desserts		43.5	15.2	1.3										
20240 87 Other frozen dairy foods	M. ltr.	351.8	145.0	1.7										
		3,800.3	1,835.4	0.5	73,747.2	38.14				2,176,130	43,794	21.0	1,189.8	38.14
TOTAL MATCHED ITEMS														
Correction			14,840.1		471,113.1	31.59					1,047,770		43,726.8	41.73
In % of specified and unspecified output			14,840.1		474,953.0	31.79					1,056,192		43,768.8	41.40
			57.4								63.61			

Source: US figures from Statistical and Fiscal, 1980 table A1.2

Ecuador figures from Censos Economicos 1980

Note: (a) Quantities converted to metric units (1 liter fluid milk equals 1.057 kilograms).

Source: Economic Review, 1980

(b) 1 gallon = 3.785 liters



Table 2.1 - Matching of Product Items, US-Ecuador, Meat, Meat Beverages and Wine (US 1977, Ecuador 1980)

United States Product Item	Unit (a)	US Quantity	US Dollar Value (mil. US\$)	US Dollar Unit Value (per ton/ ltres)	US Quantity valued at Unit (million)	PPP Ecuador Quantity US Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Ducro Value (1000 Ducro)	Ecuador Ducro Unit Value (per ton/ ltres)	Ecuador Quantity valued at US Unit Values (1000 US\$)	PPP Ecuador Quantity US Weights
1. Canned beer and ale case goods														
beer:														
20821 14	12 ounce cans	million	8,086.1	3,028.6	375.5									
20821 15	16 ounce cans	ltres	1,045.5	305.6	340.1									
20821 16	other can sizes		308.5	177.8	411.7									
20821 18	Ale		48.1	18.1	334.8									
Bottled beer and ale case goods beer:														
returnable bottles:														
20822 22	under 12 ounce bottles		245.9	78.9	318.8									
20822 24	12 ounce bottles		1,652.0	541.8	332.0									
20822 27	32 ounce bottles		130.8	29.1	222.5									
20822 28	other		130.0	38.8	285.3									
Nonreturnable bottles:														
20822 32	under 12 ounce bottles		578.1	282.1	488.7									
20822 34	12 ounce bottles		2,820.1	1,120.8	383.8									
20822 37	32 ounce bottles		370.2	117.8	318.4									
20822 38	other bottle sizes		62.0	28.7	325.5									
20822 41	Ale		80.2	28.3	291.8									
Burnts and legs														
beer:														
20823 81	one half barrel size		1,915.1	386.9	191.6									
20823 82	other barrel size		149.2	31.2	214.8									
20823 83	ale													
20824 51	Meat liquors, casks and bottles	Million ltres	465.8	214.6	441.6									
2. 20830 21														
Barley, rye, wheat malt, and malt sprouts (dry weight equivalent)														
	kg.	million	18,284.4	8,424.7	201.8	165,077.5	25.89	31321200	Meat liquors	1000 ltres	62,205.0	571,280.0	8.0	22,232.8
			2,188.8	486.7	0.2	24,008.0	48.35	31321111	Malt	kg.	8,594,814.0	108,312.0	11.1	2,150.2
3. 20840 --														
Wines, brandy, and brandy spirits:														
Grape wines, 14 percent or less														
20840 12	White	Million	457.2	308.9	675.6									
20840 14	Red	ltres	286.3	288.2	983.2									
20840 16	Rose		228.5	154.8	588.8									
20840 18	Other fruit and berry wines, 14 percent or less													
dessert wines except sparkling:														
20840 21	Grape wines, all types	Million	283.7	188.5	512.7			31321112	Wine of grapes not sparkling	ltres	448,804.0	8,519.0	13.8	
20840 29	Other dessert wines							31321114	Wine of grapes sparkling	ltres	30,881.0	1,071.0	34.9	
4. 20840 31														
Sparkling wines, natural and carbonated														
	ltres		1,467.8	819.4	628.4	22,243.8	24.18				500,580.0	7,288.0	15.2	313.8
			71.8	88.1	1,238.0	4,131.0	48.38	31321114	Wine of grapes sparkling or with gas	ltres	56,878.0	3,273.0	57.4	70.8
Matched Items														
			7,918.9	215,460.3	27.21						688,431.0		24,772.2	27.78
			7,918.9	183,888.8	24.46						818,888.5		24,823.8	24.83
			83.02								78.72			

Source: US figures Meat and Meat Beverages from table A6.2, Statistical and Retail 1980, Wine figures from US Census of Manufactures, Ecuador figures from Comercio Económico 1980

Note:

(a) Quantities converted to metric units (1 barrel equals 117 ltres, 1 US gallon equals 3.785 ltres)

Table 3.1 - Matching of Product Items, US-Ecuador, Petroleum refining and products (US 1977, Ecuador 1980)

United States Product Item	Unit (a)	US Quantity	US Dollar Value (mill. US\$)	US Dollar Unit Value	US Quantity valued at Ecuador Unit Values (mill. suc)	PPP Suc/US\$ Quantity US Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Sucre Value (1000 Sucres)	Ecuador Sucre Unit Value	Ecuador Quantity valued at US Unit Values (1000 US\$)	PPP Suc/US\$ Quantity Ecuador Weights
1. 29111 31 Motor gasoline	mill. lt.	413,985.3	40,735.5	98.4	285,145.0	6.56	35301213	Motor gasoline	1000 ltrs	105,276.7	57,208.0	0.5	102,199.2	6.56
2. 29111 13 Kerosene type jet fuel	mill. lt.	46,094.1	4,174.9	90.6			35301215	kerosene	1000 ltrs	36,410.8	17,242.0	0.5		
29113 11 Kerosene except jet fuel	mill. lt.	13,996.6	1,223.9	86.1			35301215	kerosene	1000 ltrs	197,823.0	71,999.0	0.4		
		59,990.7	5,398.8	90.0	22,855.9	4.23				234,233.8	89,241.0	0.4	21,079.6	4.23
3. 29117 21 lubricating and similar oils made in petroleum refineries	mill. lt.	8,093.1	1,962.6	205.4			35301411	lubricating oil	1000 ltrs	12,411.9	279,412.0	22.5		
29920 21 lubricating and similar oils not made in petroleum refineries	mill. lt.	5,533.2	1,100.1	198.6			35301411	lubricating oil	1000 ltrs	1,094,767.0	203,836.0	0.2		
		13,626.3	2,762.7	202.7	6,002.8	2.17				1,097,198.8	483,348.0	0.4	222,451.2	2.17
4. 29117 31 lubricating greases made in petroleum refineries	mill. lt.	159.0	56.3	354.1										
29920 31 lubricating greases not made in petroleum refineries	mill. lt.	540.8	171.9	318.0										
		699.8	228.2	328.2	14,894.9	65.67	35301412	lubricating greases	1000 ltrs	1,131.0	24,226.0	21.4	366.9	65.67
5. 29114 12 distillate fuel oil incl. grades no. 1 and 2/light gas enrichment oil/light diesel type etc.	mill. lt.	191,690.4	18,245.6	87.9	60,115.5	3.57	35301217	distillate fuels	1000 ltrs	82,563.2	36,095.0	0.4		
							35301217	distillate fuels	1000 ltrs	517,164.0	152,020.0	0.3		
										599,747.2	188,065.0	0.3	52,705.3	3.57
TOTAL MATCHED ITEMS			65,970.8		372,104.1	5.64					1,457,635.0		399,604.3	3.66
Correction in % of specified and unspecified output			70.66								61.32			

Source: US figures from table A17.2, Szirmai and Pliat, 1990.

Ecuador figures from Censos Economicos 1980

Note: (a) Quantities converted to metric units

Table 4.1 -- Matching of Product Items, US-Ecuador, 1977 Ecuador 1980

[illegible]

Table 3.1 - Matching of Product Items, US-Ecuador, Petroleum refining and products (US 1977, Ecuador 1990)

United States Product Item	Unit (a)	US Quantity	US Dollar Value (mill. US\$)	US Dollar Unit Value	US Quantity valued at Ecuador Unit Values (mill. suc)	PPP Suc/US\$ Quantity US Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Sucre Value (1000 Sucre)	Ecuador Sucre Unit Value	Ecuador Quantity valued at US Unit Values (1000 US\$)	PPP Suc/US\$ Quantity Ecuador Weights
1. 29111 31 Motor gasoline	mill. lt.	413,986.3	40,735.5	98.4	289,145.0	6.58	35301213	Motor gasoline	1000 ltres	105,278.7	57,205.0	0.5	102,196.2	6.58
2. 29111 13 Kerosene type jet fuel	mill. lt.	46,094.1	4,174.9	90.6			35301215	kerosene	1000 ltres	36,410.8	17,242.0	0.5		
29113 11 Kerosene except jet fuel	mill. lt.	13,896.6	1,223.9	88.1			35301215	kerosene	1000 ltres	187,823.0	71,999.0	0.4		
		59,990.7	5,398.8	90.0	22,855.9	4.23				224,233.8	89,241.0	0.4	21,079.6	4.23
3. 29117 21 lubricating and similar oils made in petroleum refineries	mill. lt.	8,093.1	1,662.6	205.4			35301411	lubricating oil	1000 ltres	12,411.8	278,412.0	22.5		
29920 21 lubricating and similar oils not made in petroleum refineries	mill. lt.	5,533.2	1,100.1	198.8			35301411	lubricating oil	1000 ltres	1,084,767.0	203,936.0	0.2		
		13,626.3	2,762.7	202.7	6,002.8	2.17				1,097,198.8	483,348.0	0.4	222,451.2	2.17
4. 29117 31 lubricating greases made in petroleum refineries	mill. lt.	159.0	56.3	354.1			35301412	lubricating greases	1000 ltres	1,131.0	24,228.0	21.4	366.9	65.67
29920 31 lubricating greases not made in petroleum refineries	mill. lt.	540.6	171.9	316.0										
		699.6	228.2	326.2	14,984.9	65.67								
5. 29114 12 distillate fuel oil incl. grades no. 1 and 2/light gas enrichment oil/light diesel type etc.	mill. lt.	191,890.4	16,845.6	87.9	60,115.5	3.57	35301217	distillated fuel/oils	1000 ltres	82,583.2	36,065.0	0.4		
							35301217	distillated fuel/oils	1000 ltres	517,194.0	152,020.0	0.3		
										599,747.2	188,085.0	0.3	52,705.3	3.57
TOTAL MATCHED ITEMS			65,970.8		372,104.1	5.64					1,457,635.0		396,804.3	3.66
Correction in % of specified and unspecified output			70.68								81.32			

Source: US figures from table A17.2, Szirmai and Pilat 1990.

Ecuador figures from Censos Económicos 1990

Note: (a) Quantities converted to metric units

Table 4.1 - Matching of Product Name, US-Ecuador, Fats and oils, US 1977 Ecuador 1980

United States Product Item	Unit (a)	US Quantity	US Dollar Value (mil US\$)	US Dollar Unit Value (per ton/ Btu)	US Quantity value of Escaper Unit Value (mil US\$)	PPP Std./US\$ US Quantity Weights
1. 20751 Soybean oil	1000 ton					
20751 13 Crude		1,937.4	1,015.9	524.37		
20751 15 Degummed		1,522.3	800.7	525.89		
20751 21 Net dehydrated		379.1	209.5	552.84		
20751 31 Once refined		72.8	43.6	599.10		
20751 31 Processed for feed purposes	1000 ton					
2. 20792 01 Margarine	1000 ton	3,911.5	2,069.7	529.13	122,256	59.07
3. 20741 11 Cottonseed oil, crude	1000 ton	1,156.6	1,070.4	923.87	36,697	34.28
20742 11 Cottonseed oil, once refined	1000 ton	292.4	146.6	501.35		
	1000 ton	405.7	236.5	582.95		
		698.1	383.1	548.76	13,188	34.43
4. 20791 42 Hydrogenated oil, other than baking or frying fat	1000 ton	154.1	115.6	750.16	4,368	37.96
5. 20773 61 Animal and marine oil, milk products	1000 ton	97.2	36.0	0.37		
20773 66 Fish scraps and meal		263.7	92.9	0.35		
20773 79 Other fish and marine oils	1000 ton	30.3	4.4	0.15		
		391.2	133.3	340.75	3,496	26.23
Total notified items					180,025.1	47.73
% of total specified output					3772.1	48.01
% of specified and unspecified output					181,105.2	
					26.05	

Source: US figures from table A.2.2, Standard and Pilot 1990

Escaper figures from table 1

Note: (a) Quantities converted to metric units  
(b) Conversion for vegetable oils:  
Soy bean oil: 1 Btu = 0.927 kilograms  
Cottonseed oil: 1 Btu = 0.919 kilograms  
Other oils: 1 Btu = 0.92 kilograms

Table 5.1 Matching of product items, US Ecuador, Chocolate and cacao products (US 1977, Ecuador 1980)

United States Product item	Unit (a)	US Quantity	US Dollar Value (mill. US\$)	US Dollar Unit Value (per ton)	US Quantity valued at Unit Values (mill. suc)	PPP Suc/US\$ US Quantity Weights	Code	Ecuador Product item	Unit	Ecuador Quantity	Ecuador Sucrose Value (1000 Sucrose)	Ecuador Sucrose Unit Value	Ecuador Quantity valued at US Unit Values (1000 US\$)	PPP Suc/US\$ Ecuador Quantity Weights
1. 20068 81 Cocoa butter	mil. kg.	5.4	29.4	5.4	739.0	25.14	31191114 cocoa butter	kg.	1,899,000.0	239,694.0	141.3			
							31191114 cocoa butter	kg.	759,202.0	96,044.0	126.7			
2. 20068 81 Unsweetened cocoa powdered in cans or packaged of 2 1/2 pounds or less	mil. kg.	44.4	169.9	3.8	4,960.8	29.37	31191113 cocoa powdered without sugar	kg.	2,447,202.0	334,736.0	136.8		13,317.2	25.14
							31191113 cocoa powdered without sugar	kg.	4,103,854.0	476,047.0	116.0			
							31191113 cocoa powdered without sugar	kg.	348,000.0	20,833.0	59.9			
3. 20061 12 Chocolate sweet	mil. kg.	25.5	56.5	2.2	1,779.2	31.49	31191211 chocolate sugared	kg.	4,451,854.0	496,880.0	111.6		16,917.3	29.37
							31191211 chocolate sugared	kg.	4,506,795.0	314,561.0	69.8			
							31191211 chocolate sugared	kg.	8,093,000.0	607,646.0	69.9			
									13,201,795.0	922,207.0	69.9		29,286.2	31.49
Matched items			254.8		7,478.9	29.35					1,753,825.0		59,520.8	29.47
Correction			254.8		7,449.0	29.23					1,746,609.7		59,520.8	29.35
In % of specified and unspecified output			15.64								58.53			

Source: US figures from table A5.4 Szirmai and Pilat 1990  
Ecuador figures from Censos Economicos 1980.

Table 6.1 - Matching of Product Items, US-Ecuador, Grain Mill Products (US 1977, Ecuador 1990)

United States Product Item	Unit (a)	US Quantity	US Dollar Value (mill. US\$)	US Dollar Unit Value (per ton/ litre)	US Quantity valued at Ecuador Unit Values (mill. suc)	PPP Suc/US\$ US Quantity Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Sucrose Value (1000 Sucrose)	Ecuador Sucrose Unit Value (per ton/ litre)	Ecuador Quantity valued at US Unit Values (1000 US\$)	PPP Suc/US\$ Ecuador Quantity Weights
1. 20413 Corn mill products Corn products for human consumption														
20413 11 Whole cornmeal	ton	123,190.0	31.8	256.1										
20413 15 Degemmed cornmeal		222,300.8	59.7	268.6										
20413 21 Corn grits and hominy		382,218.2	63.4	165.9										
20413 23 Corn grits and flakes		470,865.2	58.9	125.1										
20413 93 Corn flour		195,732.4	32.2	164.5				31161212 Flour granules	ton	8,807.1	56,134.0	6,373.7		
20413 95 Other corn mill products human cons.	ton	199,085.2	35.5	176.3				31161311 Other products of corn	ton	1,095.9	4,708.0	4,292.0		
		1,593,392.8	281.5	176.7	9,788.5	34.77				9,904.0	60,842.0	6,143.2	1,746.7	34.77
2. 20413 97 other corn products not for human consumption	ton	112,064.8	13.7	122.3	378.2	27.68	31162100 Residuals of flour not for human consumption		ton	31,503.0	106,610.0	3,384.1	3,851.3	27.68
4. 20440 Milled rice and byproducts:														
20440 11 Head rice	ton	1,794,934.4	582.2	324.4										
20440 15 Packed in 100 pound bags or more	ton	306,946.4	240.9	784.8										
20440 17 Packed in 3 pound containers or less	ton	727,444.2	37.5	51.6										
		2,829,328.0	860.6	304.2	56,563.8	68.05	31161100 Rice		ton	67,898.1	1,619,386.0	20,686.8	26,736.1	68.05
Matched items														
Correction			1,155.8		66,731.5	56.47					1,686,636.0		32,237.0	61.44
In % of specified and unspecified output			23.37		67,631.8	56.52					1,665,046.6		32,237.0	60.46
											38.59			

Source: US figures from table A3.2, Szirmai and Pitar 1990

Ecuador figures from Censos Económicos 1990

Note: (a) Quantities are converted to metric units:

1 cwt equals 50.8 ton

1 mill. lb. equals 454 ton

Table 7.1 - Matching of Product Items, US-Ecuador, Textile Yarn and Woven Fabrics (US 1977, Ecuador 1980)

Product Item	Unit	US	US	US	US	PPP	Code	Ecuador Product Item	Unit	Ecuador	Ecuador	Ecuador	Ecuador	Ecuador	PPP
		Quantity	Dollar Value (mil. US\$)	Dollar Unit	Value	valued at Ecuador Unit				Suc/US\$ US	Quantity	Sucra Value (1000 Sucra)	Sucra Unit	Quantity valued at US Unit	Suc/US\$ Ecuador Quantity Weights
(mil.auc)															
3. Noncellulosic and silk spun yarns															
Polyester spun yarns															
22814 20	Polyester spun yarns	ml kg	267.6	726.3	2.5										
22814 41	Polyester spun yarns, fin.		120.4	204.2	2.4										
22814 31	Polyester blends with cotton		27.3	63.0	2.3										
22814 32	All other polyester		34.6	126.2	3.7										
22814 60	All other noncellulosic and silk spun yarns, except polyester		365.7	1,004.3	2.8		2211211	Yarns which combine totally or partly, disc. synthetic fibers	k	6,878,220.0	642,946.0	121.6			
22814 61	All other etc. fin.		160.6	431.4	2.7										
22860 30	Acrylic and/or modacrylic		17.9	76.4	4.4										
22860 34	All other noncel.	ml kg	60.3	223.3	3.2		2211213	Yarns of conditional disc. synth. fibers	k	41,750.0	12,119.0	260.3			
			1,063.6	2,872.1	2.7					6,829,660.0	625,065.0	122.8		19,086.3	44.80
4. Cotton yarn															
22811 10	Carded cotton yarn	ml kg	261.6	646.1	2.6										
22812 10	Combed cotton yarn		144.0	474.9	3.3										
22811 67															
22860 21	Carded yarn finished		44.1	116.8	2.6										
22812 51	Combed cotton yarn dyed														
22860 23	Finished														
22812 61			13.2	55.3	4.2										
22860 36	Yarns mercerized cotton		6.9	47.5	5.3										
22812 71															
22860 12	Yarns bleached	ml kg	7.3	26.3	3.6										
			536.1	1,266.9	2.9		2211212	Cotton yarn	k	2,161,021.0	322,444.0	153.7		6,266.6	20.86
Matched Items															
Correction			4,336.0											23,373.2	46.86
n % of specified and unspecified output			4,336.0											23,373.2	45.77
			86.7												

Source: US figures from table A7.2, "Semiannual and Full Ecuador figures from Canecon Econometric 1980



Table B.1 : Matching of Product Items, US Ecuador, Paints (US 1977, Ecuador 1980)

United States Product Item	Unit (a)	US Quantity	US Dollar Value (mil. US\$)	US Dollar Unit Value	US Quantity valued at Ecuador Unit Value (mil.ave)	PPP Sur./US\$ Quantity US Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Sucro Value (1000 Sucro)	Ecuador Sucro Unit Value	Ecuador Quantity valued at US Unit Value (1000 US\$)	PPP Sur./US\$ Quantity Ecuador Weights
1. 28011 30 Varnish, oileroushouse	mil.	7.9	13.2	1.7			30211312	Other varnishes and lac except based on cellulose	litres	159,479.1	43,812.0	274.7		
28011 70 Varnishes, incl. shellac varnishes	litres	28.4	43.1	1.5			30211312	Other varnishes and lac except based on cellulose	litres	488,941.0	54,400.0	70.4		
		26.3	56.4	1.6	4,284.1	77.73				646,320.1	79,222.0	120.7	1,008.3	77.73
2. 28011 11 Solvent and alkyd vehicle paints	mil.	20.4	36.6	1.9										
28011 21 Solvent and alkyd vehicle house paints and tinting bases (lb.)	litres	78.9	137.1	1.7										
28011 27 Barn and roof paints		6.1	7.8	1.3										
28011 69 Semi gloss paints and lb.		47.2	79.6	1.7										
28011 43 House water emulsion paints and lb.		215.7	300.9	1.4										
28011 45 Trim and trills water emulsion paints and lb.		14.4	23.1	1.6										
28011 47 Porch and floor water emulsion paints and lb.		10.2	14.3	1.4										
28011 53 Masonry water emulsion paints and lb.		23.1	27.4	1.2										
28011 57 All purpose water emulsion paints and lb.		46.1	60.0	1.4										
28011 81 Flat water emulsion paints	mil.	407.6	491.1	1.2			30211211	Paints on water basis	litres	191,205.4	154,869.0	623.8		
28011 83 Semigloss water emulsion paints		124.1	172.9	1.4			30211211	Paints on water basis	litres	8,626,682.0	461,178.0	26.1		
28011 85 All purpose water emulsion paints	litres	27.3	30.0	1.2						9,028,217.4	616,175.0	69.2	12,281.9	20.17
		1,024.2	1,261.6	1.4	66,623.6	20.17								
Matched items			1,448.2		74,508.7	51.24					664,367.0		13,268.2	22.28
Correction			1,448.2		73,022.4	20.42					663,298.6		13,268.2	51.42
% of specified and unspecified output			21.6								68.24			

Source: US figures from table A132, Statistical Panel 1980  
Ecuador figures from Censos Económicos 1980

Note: (a) figures converted to metric units  
(b) 1 kg paint equals 1/1.3 litres  
(c) 1 kg varnishes and lac equals 1.1 litre

Table 9.1. Matching of Product Items, US-Ecuador, Bricks, Tiles and Clay (US 1977, Ecuador 1980)

United States Product Item	Unit	US Quantity	US Dollar Value (mill. US\$)	US Dollar Value 1000	US Quantity valued at Ecuador Unit Values (mill. suc)	PPP Suc/US\$ Quantity US Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Sucra Value (1000 Sucra)	Ecuador Sucra Unit Value 1000	Ecuador Quantity valued at US Unit Values (1000 US\$)	PPP Suc/US\$ Quantity Ecuador Weights
1. 32511 11 Building or common and face	million	6,696.3	659.1	76.1	27,679.6	42.00	36911111 bricks for construction		1000	65,512.2	209,242.0	3,193.9	4,992.4	42.00
2. 32530 15 other glazed floor and wall tile clay	1000 sq m	184,140.0	156.0	0.8	5,078.6	32.56	36911112 floor tiles, paving stones clay incl. glazed		m 2	8,590,149.0	226,949.0	27.6	7,286.9	32.56
3. 32710 11 concrete bricks	million	526.7	32.8	62.3	3,539.2	107.90	36991111 concrete bricks		1000	42,956.9	289,694.0	6,719.5	2,675.2	107.90
Matched Items			847.9		36,287.6	42.81					734,555.0		14,926.6	49.21
Correction			847.9		35,027.1	41.31					708,645.6		14,926.6	47.49
In % of specified and unspecified output			39.00								21.28			

Source: US figures from table A7.2, Szirmai and Pilat 1990

Ecuador figures from Censos Economicos 1980

Table 10.1 - Matching of Product Items, US-Ecuador, Sugar factories and refineries (US 1977, Ecuador 1980)

United States Product Item	Unit (a)	US Quantity	US Dollar Value (mill. US\$)	US Dollar Unit Value (per ton/ litre)	US Quantity valued at Ecuador Unit Values (mill. suc)	PPP Suc/US\$ Quantity US Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Sucrose Value (1000 Sucrose)	Ecuador Sucrose Unit Value (per ton/ litre)	Ecuador Quantity valued at US Unit Values (1000 US\$)	PPP Suc/US\$ Quantity Ecuador Weights
1. 20610 11 Raw cane sugar	1000 ton	2,028.0	576.3	284.2	30,187.1	52.38	31181111	Sugar gross	ton	2,278.7	33,918.0	14,885.5	647.5	52.38
2. 20620 Granulated cane sugar	1000 ton													
20620 08 shipped in individual services	1	35.3	21.9											
20620 12 shipped in consumer units	1	1,424.6	537.6											
20620 14 shipped in commercial units	1	1,104.2	365.6											
20620 15 shipped in bulk	1000 ton	1,429.6	373.9											
Matched items		3,993.7	1,289.0	325.3	35,359.8	27.22	31181211	Sugar refined	ton	131,834.4	1,167,247.0	8,853.9	42,880.7	27.22
Correction			1,875.3		65,546.9	34.95					1,201,166.0		43,528.3	27.60
In % of specified and unspecified output			1,875.3		63,777.2	34.01					1,166,794.5		43,528.3	28.85
			63.27								35.10			

Source: US figures from table A4.2, Saitmal and Pilat 1990

Ecuador figures from Censo Económico 1980

Table 11.1. Matching of Product Item, US Ecuador, Pulp and Paper (US 1977, Ecuador 1980)

United States Product Item	Unit	US Quantity	US Dollar Value (mill. US\$)	US Dollar Unit Value	US Quantity valued at Unit	PPP US\$/US\$ Quantity US	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Dollar Value (1000 Sucres)	Ecuador Dollar Unit Value	Ecuador Quantity valued at US Unit (1000 US\$)	PPP US\$/US\$ Quantity Ecuador
1. 26217 -- Unbleached kraft packaging and industrial converting paper	1000 ton													
26217 10 wrapping		183.3	58.2	322.0										
26217 20 shipping sack		837.7	261.8	300.5										
26217 30 bag & sack, other than shipping sack		1,820.6	524.7	273.2										
26217 40 other converting (> = 18 pounds)		43.0	232.0	480.4										
26211 -- unbleached kraft packaging and industrial converting paper board														
26211 10 unbleached liner board	1000 ton	11,440.1	2,437.9	213.1				2611513 other paper and carbon kraft for packing	ton	4.5	80.0	13,437.8		
26211 81 tube, cane and drum paper board		167.5	38.8	237.8				2611511 kraft paper	ton	14,831.7	231,178.0	13,986.7		
								2611511 kraft paper	ton	14,870.4	246,710.0	16,479.9		
		15,114.2	3,574.4	236.5						29,006.5	477,846.0	16,034.9	7,046.0	67.80
2. 26218 -- packaging and industrial converting paper, exc. unbleached kraft	1000 ton													
26218 10 wrapping		123.5	56.5	457.4				2611818 packing paper	ton	1,206.4	26,437.0	26,682.9	653.2	55.78
26218 20 shipping sack		111.0	50.8	426.5				2611813 toilet paper	ton	46.8	3,280.0	69,893.4	28.2	115.64
26218 30 other bag and sack	1000 ton	220.5	83.1	422.2				2611812 writing paper	ton	14.2	1,821.0	134,898.5		
26218 60 other converting		387.2	205.1	228.7				2611812 writing paper	ton	1,207.0	47,220.0	28,121.8		
								26118413 paper for letters	ton	43.0	1,371.0	20,468.7		
		842.2	405.8	481.8						1,286.2	50,512.0	28,891.8	715.3	70.82
3. 26210 10 toilet tissues	1000 ton	1,300.6	763.9	602.7				2611811 mechanical wood pulp	ton	1,113.9	24,305.0	21,889.9	467.2	50.20
4. 26214 20 writing, chemical wood pulp	1000 ton	2,844.0	1,724.6	585.8										
26218 10 writing, cotton fiber	1000 ton	1,882.2	860.4	531.9										
		4,806.2	2,715.0	564.9										
5. 26213 -- clay coated printing and converting paper	1000 ton													
26213 10 coated one side		443.9	286.8	683.2				2611411 other printing and writing paper	ton	656.2	26,396.0	20,820.3		
26213 20 coated two side		3,518.0	1,829.3	546.4				2611411 other printing and writing paper	ton	3,189.0	85,302.0	20,073.2		
26213 50 precolored for shipment to sell without paper making equipment	1000 ton	56.3	25.0	600.1				2611812 coated paper	ton	137.1	5,888.0	43,544.8		
		4,022.2	3,260.8	562.1						4,182.2	127,686.0	30,672.5	2,298.6	54.57
6. 26111 -- Special alpha and desalting wood pulp	1000 ton	1,304.4	570.5	437.3										
Matched Item			10,310.3								720,284.0		11,272.5	63.80
Correction			10,310.3								711,682.1		11,272.5	63.13
In % of specified and unspecified output			47.23								28.1			

Sources: US figures from table A12.2, Statistical and Price 1980  
Ecuador figures from Canales Económicas 1980

Table 12.1 - Matching of Product Items, US-Ecuador, hydraulic cement (US 1977, Ecuador 1980)

United States Product Item	Unit	US Quantity	US Dollar Value (mill. US\$)	US Dollar Unit Value	US Quantity valued at Ecuador Unit Values (mill.suc)	PPP Suc/US\$ US Quantity Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Sucre Value (1000 Sucre)	Ecuador Sucre Unit Value	Ecuador Quantity valued at US Unit Values (1000 US\$)	PPP Suc/US\$ Ecuador Quantity Weights
1. 32410 12 Normal portland cement ASTM type I	mill. tons	46.3	1,977.6	42.7	89,347.6	45.16		38921100 hydr. cement	ton	729,988.0	1,407,247	1,927.77	31,147.7	45.16
2. 32740 11 Quicklime	mill. tons	927.2	329.6	355.5										
32740 51 Hydrated lime	mill. tons	250.9	100.8	401.8				38921211 quick lime	ton	5,094.6	8,261	1,621.53		
32740 71 Dead burned dolomite	mill. tons	87.4	35.2	402.6				38921212 slacked lime	ton	2,806.6	3,809	1,356.17		
		1,285.5	465.6	367.9	1,932.8	4.15				7,903.2	12,070	1,527.23	2,907.6	4.15
Matched items			2,443.2		91,290.3	37.36					1,419,317.0		34,055.3	41.66
Correction			2,443.2		84,890.7	34.75					1,319,964.8		34,055.3	
In % of specified and unspecified output			69.5								66.5			

Source: US figures from table A21.2.; Schmal and Pilat 1990  
Ecuador figures from Censos Económicos 1990.

Source: US figures from table A21.2, Strimal and Pilet 1990  
Ecuador figures from Censos Economicos 1980.

Table A131. Matching of Product Items, US-Ecuador, Tires and Inner Tubes (US 1977, Ecuador 1980)

United States Product Item	Unit	US Quantity	US Dollar Value (mill. US\$)	US Dollar Unit Value	US Quantity valued at Unit Values (mill. US\$)	PPP Sucr/US\$ US Quantity Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Sucr Value (1000 Sucr)	Ecuador Sucr Unit Value	Ecuador Quantity valued at US Unit Values (1000 US\$)	PPP Sucr/US\$ Ecuador Quantity Weights
1. 20111 - passenger car pneumatic tires 201115 other	million	110.6	2,112.8	19.1	18,263.2	8.77	2051111 pneumatic rubber tires for normal use cars		piece	209,942.0	65,414.0	167.5	8,740.5	8.77
2. 20114 21 passenger car and motorcycle	million	19.7	47.8	2.4	3,323.5	68.57	20511200 inner-tubes for rubber pneum. tires		piece	382,541.0	61,200.0	168.6	878.7	68.57
Matched Items			2,180.4		21,850.7	10.11					146,614.0		10,620.2	13.81
Correction			2,180.4		20,801.9	9.83					139,578.5		10,620.2	13.14
In % of specified and unspecified output			24.08								14.10			

Source: US figures from table A72, "Sernam and P&G"  
Ecuador figures from Censos Economicos 1980

Table 14.1 - Matching of Product Items, US-Ecuador, Tobacco (US 1977, Ecuador 1990)

United States Product Item	Unit	US Quantity	US Dollar Value	US Dollar Unit	US Quantity valued at Unit	PPP Sucr/US\$ US Quantity Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Sucr Value	Ecuador Sucr Unit	Ecuador Quantity valued at US Unit	PPP Sucr/US\$ Ecuador Quantity Weights
			(mill. US\$)		(mill. suc)						(1000 Sucr)		(1000 US\$)	
1. Cigarettes														
Filter tips:														
21110 13 < 80 millimeters long	million	70,693.0	593.2	8.4										
21110 16 85-90 millimeters long	million	359,294.0	3,149.7	8.8										
21110 18 >= 100 millimeters long	million	182,164.0	1,730.3	9.5										
Non-filter tips														
21110 53 < 80 millimeters long		(b)	(b)											
21110 57 >= 80 millimeters long		(b)	(b)											
		679,022.0	6,098.2	9.0	353,229.3	57.92	31401312 Cigarettes	1000	3,028,360.0	1,575,362.0	520.2	27,197.3	57.92	
Matched Items			6,098.2		353,229.3	57.92				1,575,362.0		27,197.3	57.92	
Correction			6,098.2		233,464.6	36.29				1,041,314.3		27,197.3	36.29	
In % of specified and unspecified output			95.6							50.46				

Source: US figures from table A7.2., Szirmai and Pilat 1990  
Ecuador figures from Censos Economicos 1990  
Note: (b) Figure included in total

Source: US figures from table A7.2, Szirmai and Pilat 1990

Ecuador figures from Censos Económicos 1990

Note: (b) Figure included in total





Table 16.1. Matching of Product Items, US Ecuador, Footwear and leather Products (US 1977, Ecuador 1983)

United States Product Item	Unit	(e)	US Quantity	US Dollar Value (mil. US\$)	US Dollar Unit Value (per box/ lb.)	US Quantity valued at Ecuador Unit	PPP US\$ Quantity	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Dollar Value (1000 Sucres)	Ecuador Dollar Unit Value (per box/ lb.)	Ecuador Quantity valued at US Unit	PPP US\$ Quantity
1. 31425 15 Men's dress and casual shoes	mil. pair		66.3	672.5	132	20,608.6	23.82	3240111 Total shoes for men	pair	1,889,200.0	267,467.0	310.6		24,672.0	23.82
2. 31446 15 Women's shoes, casual except sandals	mil. pair		64.1	324.8	62			32402100 Ankle and other short shoes women	pair	1,803,425.0	24,982.0	182			
31446 17 Women's dress shoes	mil. pair		50.0	480.8	9.6			32401811 Shoes for women NEP	pair	2,459,887.0	461,162.0	203.5			
			114.1	1,053.2	9.6	14,181.1	14.12			4,254,302.0	228,124.0	124.4		27,478.6	14.12
3.															
31111 15 Sole leather	MIL.		10.3	123.9	12.7										
31111 25 Upholstery leather	sq. m.		6.5	86.9	13.5										
31111 37 Upper leather			437	466.7	11.1										
31111 41 Patent leather			1.0	10.7	10.4										
31111 42 Garment leather			3.3	30.6	9.2										
31111 47 Other skins			7.8	72.5	9.4										
31111 67 Finished split	MIL.		15.8	60.5	5.4										
31111 67 Finished cattle hide	sq. m.		3.3	33.5	10.3										
			91.6	600.3	10.4	22,089.2	33.78	3231011 Boxlike cattle leather except bull calf	m.2	26,640.0	12,809.0	250.4		363.7	33.78
4. 31610 18 Women's hand luggage, except shipped			5,123.0	107.2	20.8										
31610 37 Men's hand luggage, except shipped			1,386.0	30.1	21.5										
31610 38 molded			1,356.0	35.7	22.8										
31610 38 Zippered hand luggage men & women			9,817.0	147.1	14.8										
			17,867.0	320.1	17.8	1,403.3	4.39	3231212 Hand suit cases	piece	969,216.0	44,426.0	78.1		10,126.1	4.39
5. 31610 64 Aspic cases			1000	3,678.0	56.3	15.0	13.86	3231213 Aspic cases	piece	68,328.0	14,306.0	206.8		1,020.7	13.86
6. 31610 33 Occupation luggage cases			1000	3,570.0	32.5	8.1									
31610 63 Trunks			1000	1,620.0	18.3	11.9									
			5,180.0	51.8	10.0	3,103.3	56.85	3231211 Leather travel bags	piece	8,403.0	5,626.0	266.3		63.8	56.85
Matched Items				3,256.2		72,216.6	22.17				1,162,606.0		73,896.0	16.14	
Correction				3,256.2		71,765.3	22.03				1,158,794.3		77,269.5	13.35	
In % of specified and unspecified output				62.8							61.40				

Source: US figures from table A102, Sarmal and Pinal 1980, Ecuador figures from Censos Economicos 1980

Source: US figures from table A102, Statistical and Price 1980, Ecuador figures from Censos Economicos 1980

Table 17.1. Matching of Product Items, US-Ecuador, TV and Radio receivers (US 1977, Ecuador 1983)

United States Product Item	Unit	US Quantity	US Dollar Value (mil. US\$)	US Dollar Unit Value (per ton/ lbs)	US Quantity valued at Unit	PPP Sur./US Quantity Weights	Code	Ecuador Product Item	Unit	Ecuador Quantity	Ecuador Surco Value (1000 Surco)	Ecuador Surco Unit Value	Ecuador Quantity valued at US Unit Value (1000 US\$)	PPP Sur./US Quantity Weights
1. 36512 -- Television receivers Table and portable models: 36512 11 Monochrome <=10 inches 36512 12 Monochrome >10-17 inches 36512 13 Monochrome >17 inches	1000 1 1000	1214.8 1214.8 1000	113.9 113.9 80.8	80.8 80.8 7.288.4	84.35	36521111 Television black and white	piece	36.167	218.247	6.004.4	3.381.6	84.35		
2. 36514 75 Power amplifiers Monophonic 36514 76 Stereophonic 36514 77 Quadrophonic	1000	86.1	26.5	273.8	217.7	8.21	36521700 Amplifiers	piece	4.877	11.273	2.285.0	1.372.4	8.21	
4. 36514 05 Recordplayers Automatic changer 36514 06 manual	1000 1000	888.7 87.8	30.2 4.9	43.8 35.7	214.16	36521311 Recordplayers	piece	24.024	232.536	8.673.2	1.085.8	214.16		
Matched Items Correction			173.5 173.5		15.094.0 14.481.6	80.83 82.27					442.026.0 444.487.9		5.946.8 5.946.8	78.88 78.88

Source: US figures from US Census of Manufactures 1977, Ecuador figures from Censos Económicos 1980.

## **Annex II**

### **Sample Industry Results**

Table II.1  
Gross Value of Matched Output in Sample Industries, Ecuador (1980)/USA (1977)  
(after correction for taxes and subsidies)

	at Ecuador "prices"		Quantity	at US "prices"		Quantity
	Ecuador 1980 (1980 Suc million)	USA 1977 (1980 Suc million)	Relative Ecuador/ USA (%)	Ecuador 1980 (1977 US\$ million)	USA 1977 (1977 US\$ million)	Relative Ecuador/ USA (%)
Sample Industries:	(1)	(2)	(3)	(4)	(5)	(6)
1 Dairy Products	1,056.1	474,882.0	0.22	43.7	14,940.1	0.29
2 Fats and Oils	2,796.7	181,105.2	1.54	86.8	3,825.6	2.27
3 Grain Mill Products	1,955.1	67,631.8	2.89	32.2	1,155.8	2.79
4 Sugar & Sugar Factories	1,168.7	63,777.2	1.83	43.5	1,875.3	2.32
5 Confectionery Products	1,746.8	7,449.0	23.45	59.5	254.8	23.35
6 Malt, Malt Beverages and Wine	618.9	193,698.8	0.32	24.8	7,919.9	0.31
7 Tobacco and Tobacco Products	1,041.3	233,484.6	0.45	27.2	6,098.2	0.45
8 Textile Yarn and Cloth	1,161.4	211,254.2	0.55	25.4	4,539.0	0.56
9 Men's Clothing	1,382.1	311,554.2	0.44	69.3	9,059.9	0.76
10 Footwear and Leather Products	1,186.8	71,785.5	1.65	77.3	3,258.2	2.37
11 Pulp and Paper	711.6	691,031.5	0.10	11.3	10,310.3	0.11
12 Paints	683.3	73,022.4	0.94	13.3	1,448.2	0.92
13 Tires and Inner Tubes	139.6	20,801.9	0.67	10.6	2,160.4	0.49
14 Bricks	708.9	35,027.1	2.02	14.9	847.9	1.76
15 Cement	1,320.0	84,890.7	1.55	34.1	2,443.2	1.40
16 Radio and TV Receivers	444.5	14,491.6	3.07	5.9	416.8	1.42
Total Matched Output	18,121.8	2,735,887.7	0.66	579.8	70,553.6	0.82

TABLE II.2  
Volume and Unit Value Movements in the USA in Sample Industries,  
1980 as a percentage of 1977

	1980 Volume 1977=100 "q"	1980 Unit Values 1977=100 "p"
Sample Industries:	(1)	(2)
* 1 Dairy Products	97.94	133.20
* 2 Fats and Oils	110.39	114.10
* 3 Grain Mill Products	87.44	153.81
4 Sugar & Sugar Factories	89.07	212.00
5 Confectionery Products	104.23	119.35
6 Malt, Malt Beverages and Wine	113.37	52.97
* 7 Tobacco and Tobacco Products	96.90	137.60
8 Textile Yarn and Cloth	94.53	112.81
* 9 Men's Clothing	95.69	119.92
10 Footwear and Leather Products	91.14	113.16
11 Pulp and Paper	107.87	132.63
* 12 Paints	97.47	55.08
13 Tires and Inner Tubes	70.07	73.00
14 Bricks	101.10	96.54
* 15 Cement	95.81	135.95
16 Radio and TV Receivers	110.93	94.35

Source: Figures for the quantity adjustment are from US Department of Commerce, US Industrial Outlook various issues, except for industries denoted with '\*' which are the figures from US Industrial Outlook 1982 and are the figures for 1979. Figures for unit value adjustment from 1980 Census of Manufactures and Annual Survey of Manufactures.

TABLE II.3  
Gross Value of Matched Output in Sample Industries, Ecuador (1980)/USA (1980)

	at Ecuador "prices"		Quantity Relative Ecuador/ USA (%)	at US "prices"		Quantity Relative Ecuador/ USA (%)
	Ecuador 1980 (1980 Suc million)	USA 1980 (1980 Suc million)		Ecuador 1980 (1980 US\$ million)	USA 1980 (1980 US\$ million)	
Sample Industries:	(1)	(2)	(3)	(4)	(5)	(6)
1 Dairy Products	1,056.1	465,099.4	0.23	58.2	19,490.3	0.30
2 Fats and Oils	2,796.7	199,922.0	1.40	99.0	4,818.5	2.06
3 Grain Mill Products	1,955.1	59,137.2	3.31	49.5	1,554.5	3.19
4 Sugar & Sugar Factories	1,168.7	56,806.4	2.06	92.2	3,541.1	2.60
5 Confectionery Products	1,746.8	7,764.1	22.50	71.0	317.0	22.40
6 Malt, Malt Beverages and Wine	618.9	219,596.3	0.28	13.1	4,756.1	0.28
7 Tobacco and Tobacco Products	1,041.3	226,246.6	0.46	37.4	8,131.0	0.46
8 Textile Yarn and Cloth	1,161.4	199,698.6	0.58	28.7	4,840.4	0.59
9 Men's Clothing	1,382.1	298,126.2	0.46	83.1	10,396.4	0.80
10 Footwear and Leather Products	1,186.8	65,425.3	1.81	87.5	3,360.3	2.60
11 Pulp and Paper	711.6	745,415.7	0.10	15.0	14,750.7	0.10
12 Paints	683.3	71,174.9	0.96	7.3	777.5	0.94
13 Tires and Inner Tubes	139.6	14,575.9	0.96	7.7	1,105.1	0.70
14 Bricks	708.9	35,412.4	2.00	14.4	827.6	1.74
15 Cement	1,320.0	81,333.8	1.62	46.4	3,182.4	1.46
16 Radio and TV Receivers	444.5	16,075.5	2.77	5.6	436.2	1.28
Total Matched Output	18,121.8	2,761,810.4	0.66	716.2	82,284.9	0.87

Table II.4  
Sample Industry Purchasing Power Parities,  
Ecuador/USA (Sucre to the US\$), 1980

PPP: Sucre/US \$

	US Quantity Weights	Ecuador Quantity Weights	Geometric Average
Sample Industries:	(1)	(2)	(3)
1 Dairy Products	23.9	18.1	20.8
2 Fats and Oils	41.5	28.2	34.2
3 Grain Mill Products	38.0	39.5	38.8
4 Sugar & Sugar Factories	16.0	12.7	14.3
5 Confectionery Products	24.5	24.6	24.5
6 Malt, Malt Beverages and Wine	46.2	47.1	46.6
7 Tobacco and Tobacco Products	27.8	27.8	27.8
8 Textile Yarn and Cloth	41.3	40.5	40.9
9 Men's Clothing	28.7	16.6	21.8
10 Footwear and Leather Products	19.5	13.6	16.3
11 Pulp and Paper	50.5	47.5	49.0
12 Paints	91.5	93.3	92.4
13 Tires and Inner Tubes	13.2	18.0	15.4
14 Bricks	42.8	49.3	45.9
15 Cement	25.6	28.5	27.0
16 Radio and TV Receivers	36.9	79.9	54.2
Exchange rate	25.0	25.0	25.0

TABLE II.5  
Gross Value Added (US Census Concept) in Sample Industries, Ecuador/USA, 1980

Sample Industries:	at Ecuador "prices"		Quantity relative Ecuador/ USA (%)	at US "prices"		Quantity relative Ecuador/ USA (%)
	Ecuador 1980 (1980 Sucre million)	USA 1980 (1980 million)		Ecuador 1980 (1980 US\$ million)	USA 1980 (1980 million)	
	(1)	(2)	(3)	(4)	(5)	(6)
1 Dairy Products	334.5	178,420.1	0.19	18.4	7,476.8	0.25
2 Fats and Oils	990.5	117,110.3	0.85	35.1	2,822.6	1.24
3 Grain Mill Products	1,245.4	57,613.5	2.16	31.5	1,514.4	2.08
4 Sugar & Sugar Factories	2,044.8	25,258.1	8.10	161.4	1,574.5	10.25
5 Confectionery Products	767.7	19,936.4	3.85	31.2	813.9	3.83
6 Malt, Malt Beverages and Wine	564.1	199,093.0	0.28	12.0	4,312.0	0.28
7 Tobacco and Tobacco Products	1,278.3	149,891.5	0.85	45.9	5,386.9	0.85
8 Textile Yarn and Cloth	2,655.2	79,258.8	3.35	65.5	1,921.1	3.41
9 Men's Clothing	1,716.7	214,826.3	0.80	103.2	7,491.5	1.38
10 Footwear and Leather Products	954.0	56,525.3	1.69	70.3	2,903.2	2.42
11 Pulp and Paper	799.7	648,110.3	0.12	16.8	12,825.2	0.13
12 Paints	386.1	325,826.2	0.12	4.1	3,559.2	0.12
13 Tires and Inner Tubes	507.8	53,757.3	0.94	28.1	4,075.6	0.69
14 Bricks	1,991.3	53,946.6	3.69	40.4	1,260.7	3.21
15 Cement	1,110.4	59,743.7	1.86	39.0	2,337.6	1.67
16 Radio and TV Receivers	314.5	99,688.7	0.32	3.9	2,705.2	0.15
Total Manufacturing	17,660.7	2,339,006.2	0.76	707.0	62,980.4	1.12

Source: Derived from table 4.1 and 4.5. Purchasing power parities from table 4.5 are used to transform gross value added. PPP's at Ecuador quantity weights are used to calculate column 4 from column 1, PPP's at US quantity weights are used to calculate column 2 from column 5.

TABLE II.6  
Gross Value Added per Employee in Sample Industries, Ecuador/USA 1980

Sample Industries:	at Ecuador "prices"		Ecuador/ USA (%)	at US "prices"		Ecuador/ USA (%)
	Ecuador 1980 (1980 Sucre)	USA 1980 (1980 million)		Ecuador 1980 (1980 US\$)	USA 1980 (1980 million)	
	(1)	(2)	(3)	(4)	(5)	(6)
1 Dairy Products	188,751.7	1,195,044.1	15.79	10,403.3	50,079.0	20.77
2 Fats and Oils	432,136.1	2,755,536.2	15.68	15,303.1	66,414.1	23.04
3 Grain Mill Products	402,115.9	2,730,497.8	14.73	10,186.4	71,772.5	14.19
4 Sugar & Sugar Factories	211,110.4	1,512,463.9	13.96	16,658.3	94,281.4	17.67
5 Confectionery Products	466,385.8	2,034,328.6	22.93	18,960.1	83,051.0	22.83
6 Malt, Malt Beverages and Wine	1,352,839.3	3,686,907.6	36.69	28,714.9	79,851.9	35.96
7 Tobacco and Tobacco Products	1,073,267.8	3,814,033.5	28.14	38,576.2	137,071.2	28.14
8 Textile Yarn and Cloth	243,577.7	817,101.1	29.81	6,009.5	19,805.2	30.34
9 Men's Clothing	78,529.8	517,404.3	15.18	4,721.9	18,043.1	26.17
10 Footwear and Leather Products	91,870.6	400,037.6	22.97	6,771.3	20,546.4	32.96
11 Pulp and Paper	465,183.8	3,081,836.9	15.09	9,797.4	60,985.3	16.07
12 Paints	604,253.5	5,229,955.3	11.55	6,478.2	57,130.0	11.34
13 Tires and Inner Tubes	645,213.5	616,482.9	104.66	35,764.1	46,738.5	76.52
14 Bricks	249,255.0	1,133,331.7	21.99	5,057.7	26,485.3	19.10
15 Cement	1,214,840.3	1,645,831.8	73.81	42,665.7	64,396.7	66.25
16 Radio and TV Receivers	336,673.4	1,533,672.9	21.95	4,216.3	41,618.5	10.13

Table 11.7  
Census labour input, Ecuador and the USA, 1980  
(persons)

	Ecuador Total Persons Engaged 1980	USA Total Persons Engaged 1980
1 Food Manufacturing	39,411	1,537,000
2 Beverages	5,619	197,000
3 Tobacco Products	1,191	58,000
4 Textile Mill Products	19,818	817,000
5 Wearing Apparel	21,860	1,307,000
6 Leather Products and Footwear	10,396	232,000
7 Paper Products, Printing and Publishing	9,498	1,908,000
8 Chemicals and Coal Products	8,306	956,300
9 Rubber and Plastic Products	5,333	703,000
10 Non-metallic Mineral Products	10,969	613,000
11 Electrical Machinery and Equipment	4,998	1,963,000
12 Machinery and Transport Equipment	3,931	1,771,000
13 Wood Products, Furniture and Fixture	24,079	1,171,000
14 Basic and Fabricated Metal Products	15,625	2,713,000
15 Other Manufacturing Industries	3,617	1,045,000
Total Manufacturing	187,249	16,991,300

### Annex III Productivity Results for Oil Refineries

A specific case in this study was that of the oil industry. By using the available data from the Ecuadorian census a productivity comparison was made Table III.1 presents the results.

Table III.1  
Results for Oil Industry

1.	At Ecuador "prices"			At US "prices"		
	Ecuador 1980	USA 1977	Quantity Relative	Ecuador 1980	US 1977	Quantity Relative
Gross Value Matched Output	1,457.6	372,104.1	0.4	398.8	65,970.8	0.6
2.	At Ecuador "prices"			At US "prices"		
	Ecuador 1980	USA 1980	Quantity Relative	Ecuador 1980	US 1980	Quantity Relative
Gross Value Matched Output	1,457.6	359,080.5	0.4	854.0	136,319.1	0.6
3.	US Quantity Weights	Ecuador Quantity Weights	Geometric Average			
Purchasing Power Parity	2.6	1.7	2.1			
4.	At Ecuador "prices"			At US "prices"		
	Ecuador 1980	USA 1980 (1980 Sucre Million)	Quantity Relative	Ecuador 1980	US 1980 (1980 US\$ Million)	Quantity Relative
Gross Value Added	840.4	60,443.0	1.4	492.4	22,946.2	2.1
5.	At Ecuador "prices"			At US "prices"		
	Ecuador 1980	USA 1980 (1980 Sucre)	Ecuador/ USA (%)	Ecuador 1980	US 1980 (1980 US\$)	Ecuador/ USA (%)
Gross Value Added Per Employee	695,712.0	521,060.0	133.5	407,590.0	197,812.0	206.1

When analysing the results for oil refineries it is interesting to see a) an extreme low PPP with a geometric average of 2.1 and b) an extreme high level of labour productivity of Ecuador of over 200% using US price weights. Without no doubt this industry is important for both countries. The census of Ecuador states that figures for oil refineries are excluded. But despite this statement the census does present figures for oil refineries which have been used here. Domestic prices for oil refineries are not consistent with an international price system. The large share of subsidies play a serious role in the determination of prices in Ecuador. In addition, the national accounts of Ecuador show negative figures for value added of oil refineries. Taking these specific problems into account oil refineries were excluded from the calculations.



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